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W. XAVIER SUDDUTH, M.D., D.D.S.

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SHOCK, IN RELATION TO DENTAL OPERATIONS.2

BY JAMES TRUMAN, D.D.S.

I am about to treat of a matter which I am well aware is not usually considered within the domain of the dental operator, and yet one familiar in all its phases to the medical observer. I am, therefore, placed in the rather unenviable position of taking a theme not of general interest to the dental practitioner, and, while not fully understood, somewhat trite to the general medical thought. My object is, however, to lead up to inferences from facts in general practice to, perhaps, a more intelligent conception of certain phenomena observable in dental practice. In order to do this, I am forced to the consideration of shock, or collapse, as a condition preliminary to my deductions; in a word, I desire to accentuate the known facts in order that I may draw conclusions to be made more or less obvious as I proceed.

It is a well-known fact that death may come to the individual and no trace of antecedent injury be manifest. Depression to the general circulating system may be apparent, and the medical attendant be wholly at a loss to define the cause. Mental emotion may produce changes at once rapid in its effects and leaving results of a character that time may searcely efface. The true definition of shock may be termed a "sudden depression of the vital powers resulting from an injury, more or less grave, or an impression made

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on the nervous system, or by fright; sudden and overpowering mental emotion." (Black.) While death may result from such a depression of vital powers, this extreme result is by no means always the case; but that the changed condition of the circulation may lead up to grave symptoms is clear, when it is understood that the delayed phenomena may be more serious than would be suggested at the earlier and more active stage of shock.

To judge of the subject intelligently, the origin of collapse will be considered as briefly as may be consistent with the importance of the subject. Shock, or collapse, must be regarded as arising from an altered condition of the circulation produced by direct or reflex action on the nerve-centres, and without leaving any evidences of "change in the tissues; but while this is unquestionably the case in some instances, there may be in others post-mortem evidences of morbid effects. The view that shock is always dependent on an altered state of the nerves has been combatted, and Jordan has shown that potassium cyanide, by acting directly on the cardiac muscular fibre, and by impairing its contractility, gives rise to those numerous secondary effects of shock which depend on an arrested or imperfect supply of arterial blood." The condition of knowledge in regard to the action of the vaso-motor system of nerves is, perhaps, too imperfect to assign positive reasons or to argue the question absolutely from facts. Sufficient is known, however, to form a basis of reasonable inference for much of the phenomena observed. These so certainly point to nerve influence on circulation that the conclusion is inevitable,—that the impulse proceeds from a centre or centres of nerve action, and the circulation is changed by a direct loss of tonus in the vessels. That this may be understood, permit me to refer in a few words to the prevalent theories in regard to the action of the nerves on the circulation. "The dependence of the vessels upon the nerves consists in this: that the latter keep the muscular fibre of the arteries in constant tonic contraction, so that an active resistance is opposed to the expansion of the vessels from blood pressure. The continuous excitation upon the arterial wall is exercised by the sympathetic. After section of this nerve, in the neck, the lateral pressure of the walls of the vessels instantly diminishes. The blood in proportion to the pressure dilates the arteries, and further on the capillaries of the corresponding side of the head, and runs through these with such velocity that, since nutrition does not increase with the growth of the blood, it does not become venous, but remains arterial, and that, besides, since the resistance of the arteries is destroyed, the pulse continues

into the capillaries, and even into the veins; in consequence, there occurs reddening and an elevation of temperature from 3°-6° C. On the other hand, irritation of the superior cervical ganglion is followed, but more slowly, by contraction of the same vessels, paleness, and lowering of the temperature." (Wagner.) The excitomotor centre of these vaso-motor nerves is admitted to be the medulla oblongata, and "the spinal cord also is throughout an independent central organ for the vaso-motor nerves." (Goltz.) Dr. Marshall Hall (1831) made many experiments to demonstrate the effect of the brain and cord upon the circulation. He says: "It is quite obvious from these experiments that the circulation no more depends upon the medulla oblongata than upon the medulla spinalis." Without entering upon an extended examination of theories, based though they may be on facts, the generally recognized view now is that the circulation is affected by direct irritation and by reflex action, and that "special vaso-motor nerve-centres exist for the various vascular provinces." (Wagner.) Section of a vascular nerve will produce, therefore, a flow of blood to the parts to which it is distributed; that excitation by the interrupted current, or by mechanical means, produces constriction of the minute arteries; that excitation of a sensory nerve produces increased activity of the capillary circulation." (Simon.) The heart will continue to act after the removal of the nerve-centres, and hence is not directly dependent upon these, and yet it is clear that mental emotions have a direct and powerful influence upon this organ sufficient, in many cases, to produce death. True shock, as defined by some writers, must be limited to its "immediate production," while others attempt to classify it as "transitory, delayed, protracted, and insidious."

Without entering into the discussion in regard to the probability of other factors having a place in the question of shock, such as fat embolism, fat cells being absorbed from "fractured bones or lacerated adipose tissue;" or whether the continued depression is to be referred to direct or reflex action on the nerve centres, there remains this fact, that collapse is produced through a change in the circulation.

In the slighter degrees of collapse, the patient may present no marked symptoms, makes no complaint and experiences no pain. The extremities are cold, face more or less exhibiting a pinched expression. From this it may pass to the extreme form, with pallor on the surface, lips pale and bloodless, motionless, cold over the body, hardly perceptible pulse, great weakness, oppression, dizzi-

ness, nausea, confused perceptions, and respiratory movements feeble. These symptoms are not always confined to severe cases of physical injury or to excessive mental emotion; but will be manifest oftentimes after most trivial injuries, the effect being out of all proportion to the cause.

The relations which the phenomena of shock bear to dental operations may not be clear to the average observer; but to my mind they embody much subject for serious thought, and ought to lead to a clearer apprehension of our duty as practitioners.

While the evidence is very far from absolute that the conditions we are familiar with are dependent for a solution on shock, vet they are so closely allied to the phenomena already adverted to that one is naturally drawn to inferences and suggestions. It is unnecessary, in my judgment, to confine our observations to the extreme cases of collapse, for, as I have before stated, the symptoms will be very variable. The mental emotion caused by the sudden loss of near and dear friends may not amount to shock in the extreme sense; but who has not observed the long periods of weakness, the lack of mental force, the general loss of tone in the circulation, which may take months, and even years, to recover from? Whether this be ascribed to continued shock or to other pathological sequences, it certainly had its origin in a deep impression made on the nervous system, and, consequently, in a loss of controlling power. My observations and conclusions lead me to the opinion that these phenomena must be ascribed to a modified form of collapse. The mental strain produced in times of great public excitement—the effect upon a merchant who has ended a carefully ordered life with failure in business—the rapid decline of those who have commanded large bodies of men in war through many battles, most noticeable since the Rebellion—these all showing a nervous strain, and producing symptoms and lesions which must be ascribed to the insidious working of nerve influence.

It seems to me impossible to avoid the conclusion that many serious conditions, now unexplained, must be attributed to this cause; at least many more than, are now generally recognized. What is weariness but a similar effect? We call it shock when the impression is a powerful one; but is not this only a form of insidious impression, an action on the nerve centres in response to peripheral sensations? Make this an over-strain, and, if repeated and repeated, the tonus of the vessels is lost altogether, and the individual succumbs. This may not be collapse in a scientific view; but is certainly an approach, and closely allied to it in the broader

sense that the greater includes the less, and cannot be explained intelligently in any other way.

To apply these thoughts to dental operations and dental operators is a natural sequence. Dr. Black, in "The System of Dentistry," has made most of these facts familiar to you, and his views on the overtaxing of patients should be carefully read and pondered. He illustrates the importance of attending to this matter by a case in his own practice, and, as this bears directly on the subject, I quote it in full:

"A young lady of eighteen came from a distance by appointment to have carious teeth filled. Upon examination it was found that there were two exposed pulps, besides other smaller cavities. Both the young lady and her parents insisted that all should be done that day if it were possible. The operations were proceeded with, and everything without a murmur. My patient was a fine specimen of physical development, and I soon found that she prided herself on her powers of endurance. The pulps were, at her urgent request, that there should be no delay, removed directly with the broach, and the filling proceeded with. After three hours of continuous operation, the patient was discharged for two hours' rest. She returned promptly, but something in her appearance arrested my attention as not being just right; yet, in answer to questions, she said she felt perfectly well, only a little tired. The operations were resumed, and all went well at first; but after an hour, the latter part of which had been occupied in the excavation of a very sensitive cavity, I found the pulse had become very compressible, and other evidences of shock were becoming apparent. Gutta-percha fillings were placed in the cavities excavated, and operations suspended. I found it necessary to assist her to a couch, as it was evident that she was unable to walk steadily. After two hours in the recumbent posture she seemed better, and was taken to the train by her parents, and I saw her no more. I afterwards learned from her mother that her condition became much worse en route home, and that for four or five days she was in a "stupid condition," and after this she passed into a nervous fever which continued for several months. Up to the time I last heard from her, four years after the incident, she had been more or less an invalid."

Now this case may be, and is unquestionably, an extreme one; but we all know of cases, and by no means infrequent, of persons exhibiting great weakness and depression after prolonged dental operations. Indeed, so common has this been with me, that for years I have been unwilling to extend the sitting over two hours,

and then to insist on an intermission of several days. We, as dentists, interested in the operation at hand, can scarcely realize the nervous tension to which our patients are subjected. This mental and physical strain is sure to produce a condition of collapse, modified in extent though it may be, still, by constant repetition, may produce results of a grave character. The very long operations of from six to seven hours, and even longer, are, it is hoped, passed by. The craze for enormous gold operations has not only in the past depleted the purses of our patients, but has had equally injurious results upon the circulatory system. While such operations may truthfully be defended on the score of value to the teeth, they cannot be recommended in view of the possibility of permanent injury to the individual.

Surgical shock may meet us directly in cases of extraction. The shortness of this operation may lead some to regard it as of little moment; but there is probably no operation that the average mind will not more calmly consider than this. A few favored individuals blessed with very "strong nerves" can sit down and have a tooth out with a nonchalence surprising; but these are exceptional. With most of us it is a great mental strain in advance, and a great shock during the operation, and the consequent depression is fully in accord with what we know of the phenomena accompanying more important surgical cases. It has been too much the custom, in the past, to remove teeth as long as the "patient will stand it;" or, in other words, until the sufferer refuses longer to allow the forceps to enter the mouth. Hence, it is not unusual for persons to have twenty or even twenty-four teeth removed at one sitting, and dentists have been known to pride themselves on their agility in handling that many teeth in a given time. If my views, as heretofore stated, be considered as having any force, are not such operators guilty of malpractice? They certainly have taken risks that may reach beyond the limits of endurance, and, should untoward results follow, they are to blame. I presume all who listen to me to-night, of the older circle, will recall cases, in their ignorance—and we have all been ignorantly guilty in this—where, after many extractions, the patient has been confined to the bed for days with all the symptoms I have detailed. It was from such experiences that I was led in years past to refuse to extract more than six teeth at one sitting. This I regard as the only safe practice, from this point of view as well as from that other, more remote, liability to hemorrhage.

I have alluded to two forms of injury through dental opera-

tions. These might be multiplied; but they will suffice to call attention, I trust forcibly, to the necessity of great care that lasting injury be not produced in serious lesions to various organs, through this lapsing into continuous shock.

There is, however, another branch of my subject that I regard as of more importance, because it interests ourselves, and while this may be and is a somewhat selfish view, we must meet it, not only for our own good, but for the good of future generations of patients. The profession of dentistry is certainly one of the most trying at present organized into a calling. This remark I know will be met with the assertion that the exacting labors and anxieties of the physician, and the mental strain of the surgeon in capital operations, furnish evidence of greater and more prolonged nervous tension. Without attempting to argue this point, for it must be admitted that in exceptional cases the strain is greater, the fact must be recognized that the dentist, from the nature of his occupation, cannot have any respite during the working hours of the day. This means more than mere labor; it is an unbroken effort of the mental and physical powers of the operator in almost constant conflict with similar disturbed relations of the patient. The interchange of psychical influences, under such circumstances, is but little understood; but the fact is well known that one nervous patient will exhaust the operator more in one hour than a day's work over those of a quieter character. Standing, as most do, from eight or nine o'clock in the morning until four or five in the afternoon, without proper food, perhaps a glass of milk hastily swallowed, or entire abstinence, and day after day meeting all sorts of conditions of men, women, and children, the women all nerves, and the men all impatience, and the children all frightened, what, I ask, is to be expected? A few have the happy faculty of so ordering their work that it seems to leave no bad results; but the average man cannot do this, and he arrives at the end of each day with the mental and physical organization in torture. The pinched expression of his face, the sunken look about the eyes, the intense fatigue, are indicative of great nervous depression, and point directly to a minor manifestation of shock. Let this be continued day by day, month by month, and how many years do you suppose it will be before the over-strained nerves will yield, and fail to perform their proper function in regulating the circulation by keeping up the tonus of the arterial system?

As I look back over many years spent in professional work, I cannot help recalling many familiar faces that have passed away, all too early, from their active work. As I marshal them before

me, I remember bright young lives wrecked before they had scarcely begun to develop. This, while undoubtedly true of all callings, has, it seems to me, more notable cases in ours. When it is observed that the depressed condition I have referred to eventually may end in centres of inflammation in important organs—lesions that do not explain themselves, an everlasting feeling of weariness that never finds rest-all directly traceable to the continuous strain of routine professional work, it is time to pause. Is the picture overdrawn? I think not. The fact is familiar to all of you, and, doubtless, comes nearer home to many. What does it mean when the dentist throws himself down at the close of his day and, as he expresses it, is "utterly worn out?" What does it mean that, month by month, he feels less and less able to perform the routine work of the office? What does it mean when, in after years, he may be forced to seek other occupation, or yield up a portion of his specialty? What does it mean that our profession is largely made up of young men? We are familiar with the old doctor, with the old lawyer, with the old merchant; but the old dentists are so few that one is tempted to ask, "The fathers; where are they?" Examples are so numerous of this condition among dentists, that I would simply weary you with the telling; and I will, therefore, give one or two as illustrations. My mind reverts to one very familiar to me in former years. From eight in the morning until eight in the evening, of the long days of summer, he stood closely by his chair. Having partaken of a late dinner, he would throw himself down on the lounge, and lie as one in a profound collapse. This was the almost unvarying habit of years. His periods of relaxation were short and far between. He died at middle life of paralysis. Another I recall with a large practice. He never knew when to stop. His friends exhausted their powers of persuasion, myself among the number, without result. In time he too came to be a wreck, and shortly thereafter passed on into the unseen. But why multiply cases; you understand as well as I that the primal law of the organization is that there is a limit to the powers of all the organs of the body, and that activity and rest are alike essential to healthy growth; but strain means weakness, and weakness means ultimate death.

The effect of anesthetics in producing shock has not been alluded to, except incidentally, by any writer that I am aware of; but I am convinced that they furnish the conditions and produce results that simulate shock very closely. I am satisfied from my observations on persons and myself that all the symptoms of true

shock may be present on the return of consciousness, and that this may last for days. The patients complain of great weakness; the face is pale, indicative of defective circulation, and the general appearance simulates collapse. Some years ago I had nitrous-oxide adm' istered to myself by one skilled in its use. Though quite familiar with the administration of anesthetics, I had never inhaled this agent, and commenced the inflation of the lungs with determination to watch the physical effects if possible. The result was a profound narcosis as far as the body was concerned; but a very acute ability to analyze all sensations mentally. At no time were the reasoning powers obscured; nor was the extraction felt physically. While there were some curious psychic effects observed in this operation, the point that impressed me the most was the subsequent influence upon the organization. The shock was so marked that for two days afterward I found my strength was inadequate to the slightest exertion, and it was weeks before the normal condition was resumed. The personal experiences of an accident, some years previous, followed by collapse, were vividly recalled; as they were the same in kind, if not in degree.

Prof. C. N. Pierce, quoted by Dr. Litch (System of Dentistry), writing of the case of a Dr. K- who had a number of roots extracted under the influence of nitrous oxide, says of him that he was a man of good health, weighing two hundred pounds. After the extraction he went to his place of residence, distant but a few blocks, where he remained for some hours, feeling very much prostrated, his face having an ash color, and his circulation not resuming its normal condition for some hours. Within ninety days he lost forty pounds in weight, which was never recovered. He eventually died of disease of the kidneys. I am perfectly aware that this condition is ascribed to the asphyxiation of the blood by nitrous oxide, and that one authority asserts" that during asphyxia there is produced a veritable shower of sugar in the blood," producing diabetes, or aggravation of that disease if present. While this is probably true, it does not explain my own case or that of many others.

The limits of a paper will not admit of an extended examination of this or those heretofore adverted to. They are, as stated at the beginning, only suggestions, which, I hope, may lead to thoughtful consideration.

REGULATORS AND METHODS OF CORRECTING IRREGULARITIES.*

BY W. G. A. BONWILL, D. D. S., PHILADELPHIA.

My first essay on orthodontia was written in 1862. To make my own history more replete, however, it is necessary to show what I have done in this line of work since 1854. As the apparatus was then entirely new and the practice considered rather radical for the time, and as it has since been revived by others, I shall briefly present them here.

From the following language it will be seen that the "Coffin plate" of rubber was anticipated by me, except that I used silver wire made spiral, and adjustable or detachable from the plate previous to 1862

"If the inferior jaw, I clasp, where possible, and when not, strike up a plate to cover the deciduous or permanent teeth, as they may be, and operate from this. From the inward inclination of the inferior bicuspids and molars (or molars alone of the temporary set) there will be sufficient firmness gained by making it to press outward at these points."

"If there are no other means of holding it in the inferior jaw, an india-rubber plate made to fit accurately either the teeth or palate, or both; and if you desire, the surface of the vulcanized plate can be roughened to enable the patient to masticate thereon, and screw the spiral springs into this." †

This I seldom use, being bulky and dirty, and far more liable to injure the faces of the teeth. More can be done with the spiral spring soldered to a metal plate.

The same principles of action I still adhere to, namely:

1st. To commence as soon as possible after the seventh year, or as soon as there is evidence of decided irregularity.

- 2d. To watch all children's teeth from the third year and determine by an exploring needle, every three months, the exact position of the coming permanent teeth as soon as the first permanent molar has appeared.
- 3d. To preserve, by early treatment, the first and second molars—temporary—even to the treatment of their pulps, if the little patients are not brought in time to obviate it.

^{*}Advance sheets from Harris's Principles and Practice of Dentistry, 12th edition.

[†]Extract from essay on Orthodontia read before the Delaware Dental Society in 1863, and which, on account of its length, was refused publication in the Cosmos.

4th. To be sure the first permanent molars are preserved without loss of pulp, and to allow nothing to interfere with their full and free development in the arches, as upon these teeth more than upon any others are due the irregularity, from coming too far forward in the arch, from decay of approximal surfaces of temporary molars, or from the tardy eruption of the permanent incisors. The sixth year molar drives the arch into smaller space when the incisors have appeared out of or inside the arch.

If the arch is once interfered with the area is not so great, and consequently there will be a deeper underbite, and the permanent molars will move forward and always keep it so, thus causing the permanent teeth, which are yet undeveloped in the maxilla, and lying over each other and not in line, to roll over and shorten the whole maxilla in front of the permanent molar. I, therefore, endeavor to keep this tooth as far back towards the ramus as possible.

5th. That all apparatus should be simple and, if possible, firmly fixed, so that the patient can have no control over it; and then see the case every few days.

6th. That constant and uninterrupted pressure is preferable. The antagonism of the opposite jaw will always be exerting a force to make them move back and forth in the sockets, and this makes sufficient intermittent pressure.

7th. That while one plan, without some change in each ease, will not do, yet the infinite number of apparatus is a greater nuisance to patient and operator.

8th. That impressions of both jaws in plaster and a duplicate from the first; so that the plaster teeth can be cut off and rearranged to see the effect, and these models placed in the anatomical articulator, where they can be studied in the lateral movements, so necessary. That this shall be studied carefully; and, before action is taken, have the patient call and study the case in relation with the plaster model; and if doubt exists as to the extraction of a tooth or teeth, better postpone a few days and send for patient again rather than make so great a blunder.

9th. That a tooth shall be held as sacred as an eye; and, while extraction is sometimes demanded, when the greater good of the patient is at stake—when of weak constitution—yet do not too hastily resort to it.

10th. That without the combined assistance of parent and child better not commence.

11th. That nothing shall be withheld from the child or parent,

but every detail, every risk, and the amount of patient endurance needed, the long time, and, when all is corrected, to allow of stay plates, that the work gained may be retained.

12th. Not least of all the factors, you must place such valuation on your services as will insure your interest and will drive the parties concerned up to their duties.

To these points I would now further insist on the great importance of utilizing as factors or fulcrums the temporary molars.

1st. By shaping them with a disk on all their sides or surfaces, so that a gold clasp can be securely placed thereon. Figs. 22 and 23.

2d. Where only a ligature is needed, to cut a groove with the disk on the buccal and palatal and lingual surfaces near the cervix, in which to place the silk ligature to keep it from working down under the gum. Fig. 22, C. C.

These teeth will soon be lost, and no injury is done by shaping and grooving them.

- 3d. By the use of gutta-percha (Figs. 217 and 218), warmed and placed on the palatal or lingual side of the tooth, around which a ligature is to be placed and carried slightly up over the grinding surface to prevent the ligature from pressing down under the gum. This I use on permanent teeth.
- 4th. Where the tooth cannot be cut or gutta-percha used, then gum sandarach varnish or a thin solution of oxyphosphate zinc placed on the tooth will prevent the ligature from slipping when the tooth is being rotated, or to keep it from pressing up under the gum.

5th. The immense importance of the Anatomical Articulator, with the geometrical and mechanical laws governing it.

The study of this alone will lead to the anticipation of so many irregularities, and will teach one to begin very early. It shows how invariable is law; and, when violated, where the cause is and how to obviate it.

It shows what is an archetype, and demonstrates clearly how the highest efficiency is reached in the equilateral triangular jaw of man, and that nothing can be made more perfect either by nature or by man.

To make understandingly the application of these laws to orthodontia much must need be unravelled that can be seen in the American System of Dentistry, vol. ii, page 486. Presuming upon your having read the article, advantage of this will be taken and time saved by putting the matter coneisely.

What we want to get at is the insignificance of the grinding surfaces of the bicuspids and the molars with the curve at the ramus and the particular angle formed by the palatal surfaces of the superior incisors.

We want to know exactly how much the superior incisors should overlap the inferior, and how far up on the palatal surfaces of the superior incisors and cuspids the inferior should go—or the underbite—before we can understand what is a deviation, from the normal standard, and how to intelligently correct it.

I have asserted that the length of cusps of the first superior bicuspid governs the whole thing. Given such a tooth from a prehistoric age even, and it can be told how deep was the underbite of the inferior incisors. It is no guesswork.

You see hundreds of mouths with the inferior incisors going so far up that they touch the base of the superior incisors and in many cases the gums. Why is it not normal? No one can tell without knowing this law of the first superior bicuspid.

Every one assumes that the upper should close over the lower incisor; but gives as the only reason for it that the inferior being smaller in width must form a smaller arch, and must work within the superior arch of larger incisors.

There are several other reasons that this model will reveal, and could first be known and seen in it only.

Unless there is an underbite, and that regulated to a given depth by the teeth in the rear of the arch, the superior will be thrown too far forward, while the inferior will be thrown inward, so as to lose their usefulness and be a deformity, as we so often see when the bicuspids and molars are gone and no antagonizing surfaces are left as abutments. When we look at the curvature at the ramus we are reminded that there is an overbite, for were there no curve just here the muscles would act more forcibly on the side opposite to that upon which one is chewing, and the normal relation of compensation and efficiency would be destroyed.

Then I say the highest efficiency cannot be reached, or in other words, one cannot get the greatest results from the least expenditure of force, and with least wear to the teeth, except by following this design. When this is fully realized, you will see where but little change of position of the first permanent molar forward, from the extraction of a temporary molar, the normal bite is made much deeper, as it then allows the jaws to approach each other very much faster.

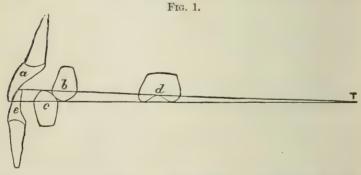
If nature intended to have given man a deep underbite, then

we should see such an arrangement of the back teeth such as carnivorous animals have, where but one long cusp is used to get the greatest amount of shearing surface.

Instead, then, of the bicuspids having cusps greater than the angle of an equilateral triangle, they would all be cuspid teeth in order that the cusps might be of value in the lateral movements. When they reach beyond an angle of 45°, efficiency is no longer gained; but a direct loss and danger of fracture by the long wedgeshaped cusps that would have to enter it. A cuspid would be much more powerful to pierce and cut, and no danger of loss from fracture.

Then I assert, when the overbite or rather underbite rises higher than one-eighth of an inch, abnormality begins; since the incisors will not permit the bicuspids and the molars to come into contact when the incisors are touching on their edges. But, by this arrangement, no matter in what lateral position you place the lower jaw, the teeth of both jaws will be touching at their separate points of the equilateral triangle at once.

We will take a natural superior first bicuspid and measure the length of its cusps, place it at the point on the two lines a and e in its relation in distance from the condyles with the superior centrals.



This will be about one-fourth the distance from the centrals to the line running from the condyles. You will now see that if these two lines a and e diverge from the point of motion at the condyles at T until they reach the superior bicuspid at b at the depth of groove, that by carrying the lines still further to the left until they strike the palatal surface of the superior incisor, the lines must be further apart than anywhere else. Fig. 1.

By this one knows exactly, when grinding on artificial teeth, that if the overbite at e and a is one-eighth of an inch, the depth of

cusps of all the teeth backward until T is reached would be of less depth, and at T would have no cusps at all.

Were this not true, only certain teeth would touch at any lateral movement; and deeper than this, the bicuspids and molars, touching but little of the time, would throw much more force on the palatal surfaces of the upper incisors to press them out of the arch, and contract the arch of inferior incisors and crowd them into a lesser arch, as so many bricks, one over the other.

It is thus apparent that the permanent molars must be in such a position that their length out of the jaw is such as to allow the inferior incisors to occupy a larger arch, and that only under such a plan can they be regular and fill their highest function.

To make the application. If we extract the first temporary molar too soon after the sixth year, the second temporary molar will be thrown forward on this scale and on these lines a, e to T, so as to allow the jaws to come closer together and force the inferior incisors further in under the wedge-shaped palatal surfaces of the superior incisors, until they begin to overlap one another; since the arch becomes less as they are driven backward by the inclined plane of the palatal surfaces of the superior incisors, and until the first molars again touch on their grinding surfaces, which is only after they have been moved forward between these lines a and e.

The same result follows should the first permanent molars not come up in the inferior jaw as fast as do the incisors. The latter are in advance, and consequently there is no prop long enough to hold the jaws from a deep underbite, or to prevent the inferior incisors from touching the gum.

Besides, if the inferior permanent incisors should be forced within the arch by non-absorption of the roots of the temporary teeth, they would have no guide from the superior incisors, and the result would be too deep an underbite.

Now this all occurs with the temporary teeth, and the first permanent molars at the seventh year.

Should the second temporary molar be extracted too soon, the deformity becomes more marked by the forward movement of the first permanent molar.

Aside from direct loss by extraction, much approximal surface is lost on all the temporary molars and on the incisors from caries. This allows the first permanent molar to move forward, and by this change in position the jaws fail to be kept apart, which, at this early age, is so necessary in order to anticipate the crowding of the

arch. Still further is this condition increased by the rapid decay of the first permanent molars, allowing the jaws to approximate still nearer, forcing the lower incisors into a much smaller arch, and consequently higher up under the superior permanent incisors.

Add to all this the crowning climax of blunders: the extraction of the first permanent molar or molars too soon. One is enough to break up the masticating surface on that side, and how great is the loss, since the force of mastication is thrown upon the incisors, which, at this early age, must drive the upper out and the lower in, and thus cause them to crowd worse than ever.

Let us now observe the condiiton of the permanent teeth in the jaws, not yet to the surface (bicuspids and cuspids), with a contracted arch, from the full complement of teeth, but with the loss of mastication in the proper region, which has prevented the expansion of the arches that is so necessary at this early age.

Even if none are extracted, the many deciduous teeth give untold pain from exposure of abscesses preventing the use of the jaws on hard food, such as is needed to develop size and bring more nutrition to the parts to make the processes.

Is it at all wonderful that we have increasing abnormality with increase of caries?

Can we not see from this pen picture what a grand field we have for shaping the destiny of individuals who are certainly doomed to greater deformity as the ages come?

Your duty lies, above all else, in watching each child with scrupulous care, making it a part of a *forced* education to go to the dentist every three months and submit to a close examination with an exploring needle to find the coming tooth in advance of looscness and also to give your best efforts to the saving of the temporary teeth before the pulps are exposed.

The principle causes of irregularity are diverted and "polluted" nutrition. Nutrition is diverted when the jaws and teeth are not actively and normally used, and it is taken up by those organs that are demanding it from their constant action before it can be applied to the bones. Polluted nutrition is where diseases of various kinds contaminate the fluids and render inactive by their poisons the organs so as to cause irregular deposits of bone in the teeth and maxillæ, retarding their growth, and consequently their arrangement, in the arch.

The choice of proper food and its mastication has a powerful effect, not only in diminishing the supply of phosphates, but also their application to the jaws and teeth from want of proper action.

The trigeminus nerve, to my mind, is not a factor.

If, then, nutrition by perversion, pollution, or diversion is a prime factor in the cause of irregularities, let us imagine the first effort that nature makes to supplant the temporary set. The first permanent molar in both jaws should be present and to their full height or place, or in contact before the central incisors are lost.

Early decay of the temporary teeth is potent in irregularities. So also is the injudicious use of the forceps, by the early or late extraction, accidents, and, not least, the meddlesome dentist. We find it almost entirely confined to civilized life. It is never found in the lower animals.

The muscles are becoming, or should be, stronger every day, as most active parts gain the most nutrition and at once. Unless the teeth are in full contact and well propped in position by alveolar borders calculated to resist the coming force to be exerted thereon, the arches in front being now the weakest of all, must be pressed out of position by the jaws being forced nearer each other. This easily occurs if nutrition has not been plentiful and has not been eagerly used in the formation of the alveolar processes.

Consider the average set of teeth of the child of six that comes to us. The further the sixth year molar goes forward between these two lines a, e, and T, the less room all the coming permanent teeth have; and, the jaws necessarily coming closer together than if the molars had remained at their place in the alveolar border, where the greatest resistance is offered, we can see how the bicuspids are rolling over one another; and in the circle, or arch, in front where the teeth are in advance in the lower jaw, but not growing as fast as they should from want of nutrition by perversion or pollution, the props—the temporary incisors—being no longer of value, the jaws approximate too closely; so when the laterals make their appearance, is it any surprise to us that they should be inside the arch in most cases? How could they arrange themselves regularly when the arch is so wanting in bone firm enough to hold them in bounds, and is suffering from caries of all the posterior teeth, while those not yet above the surface are crowding forward as the resistance is taken away owing to the condition of the temporary molars and to the lack of energy in the tissues, both soft and bony? It would be marvellous if they, in their normal state, which is apparently not in curve, should not be found one upon the other, overlapping in the border before cruption.

To add to the trouble, the irregularity of their periodicity is so great and out of proportion, that the inferior permanent incisors

are crowded into a smaller arch than the third of a circle, and there is not room for them. The malady increases as the incisors of both jaws come into place. If there is any irregularity in the superior jaw, it then becomes greater in the lower; for as the inferior teeth reach the normal point, where they should stop going up under the superior on the palatal side, they fail to do so for want of that proper resistance which a perfect arch alone in the lower would insure.

But one tooth inside the arch of the lower jaw and at once, as the superior come into place later from requiring more nutrition and want of full use from the pain of mastication, they are retarded and the lower arch becomes smaller than the third of the circle; and, as a sequence, they are crowded by the superior inward and upward until in so many instances they reach the gums at the base of the superior incisors, because, as I have said previously, the lower arch had collapsed from the many causes which should have been prevented.

This may occur in jaws where the temporary teeth are in perfect condition, as well as the sixth year molars, from a contracted alveolar border, and from absorption's not keeping time with the advance of the teeth. But it is not so often found.

Instead of contracted jaws from extraction and caries, it is the compressed alveolar borders, and the want of resistance in them, which prevents normal mandibular action, and consequently healthy nutrition cannot result.

Keep back the first permanent molars, and if possible, push them further back towards the condyles, that there may be no intrusion on the domain of the coming permanent teeth. Have the temporary teeth in such condition that free mastication can be performed. Give the child all the nutritions food it needs, with plenty of exercise and sleep. Keep saccharine matter, in the shape of cake and candy, far from it. Make it eat its food without liquids. Have the salivary glands of value by compelling them to secrete from the use of dry food, and food will be sweet enough without sugar. The food is kept longer in the mouth. The jaws are used their full time. The muscles become stronger and the alveolar borders firmer, and the nutrition is plentiful, and is utilized without any part having to cry out for want of it. The nutritious supply will then always be in advance of the demand, and well laden with everything that can give life to the organs; and good teeth and a well arranged mouth will result. Let us now consider methods of regulating.

The figures from 2 to 23 show all my appliances and their applications for irregularities. Figs. 2 to 7 show the spiral spring in various phases and which are illustrations of the original apparatus for the correction of irregularities used in illustrating my paper read before the Delaware Dental Society in 1863, above referred to, page 10. It will be observed that the "Talbot spiral spring" is a true reproduction of the figures 2 to 7. These I used for several years; but have now almost abandoned for the present simple device, shown in Figs. 8 to 11.



Fig. 2 represents a silver plate made to fit the inferior incisors, and which was tied on a central, to correct a superior central from the inclined projection on the right; the end of spring acted on the right inferior central to throw it out of the arch.



Figs. 3, 4, 5 represent metal bands with clasps, with the spiral spring soft-soldered under a metal loop hard-soldered to the band. This retains the temper. These are used on many teeth in either jaw.

Fig. 5 shows a metal plate with half-clasps fitted to the bicuspids, to hold it in position. The spiral spring is soft-soldered to the plate. This can be changed to various positions on the plate, and is applicable in cases where it is difficult to place the clasp entirely around a tooth.

Fig. 6 was made for drawing backward the four incisors of the inferior jaw with spiral springs, adjusted so as not to interfere with the tongue or the superior teeth. The piece at A goes over the incisors, and is held by ligatures tied to one or more of the teeth.

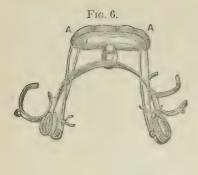




Fig. 7 shows a jack-spring for constant pressure. It may be made in a curve to conform to the hard palate. It is very powerful and effective, and superior to a jack-screw.

In all these spiral-spring appliances, the spring is tied to the tooth to be acted upon to hold it from slipping; or, in some cases, a hole drilled into the tooth is better.

The appliances that with me have superseded all others are seen in Figs. 8 to 23. Fig. 8 represents a curved bar made of platinized gold with four holes punched for the passage of silk ligatures.





Applied in Fig. 16.



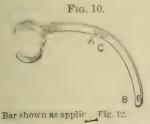


Applied in Fig. 20.

It is another way of applying Fig. 9 without band, and is used mostly for a single tooth in either jaw. The principle of action will be seen in Fig. 16, where two inferior lateral incisors are to be drawn from within out. To do so requires expansion of the jaws. This is effected by making the holes in the end of the plate over the centre of each cuspid, and by carrying the silk ligature from the mesial side of the laterals around back and up between the lateral and the cuspid and through the hole in the plate at either end, and attaching to it a rubber band which is stretched between the holes. This pushes the cuspids backward or opens the arch, and the centrals moving forward somewhat, the laterals easily fill the breach. Once in position they are retained without apparatus.

If the holes through which the ligatures pass were made exactly opposite the laterals, no good would be effected, because the pressure would be as much down as out, thus compressing the arch. But the ligatures applied as directed force the teeth apart,

although the band is resting hard on the cuspids. The ligature is a loop or slipknot, and must be applied so as to come out between the lateral and the cuspid. Gum sandarach varnish will keep it





from slipping around the tooth. The band as heretofore applied has not expanded the arches, because the holes were not in the right places—over the cuspids.

Fig. 9 is this same bar with a clasp on one side of the arch. The bar is lengthened beyond the clasp to allow of the rubber tubing, tied at B, being attached far enough away from A in order to give suffibient power to move the teeth desired.

It was applied, Fig. 20, by clasping a first molar where the right central had to be twisted, and the lateral also, but in opposite directions. The bar rests upon the mesial buccal edge of the lateral while the silk ligature is carried twice around the central, bringing it up next the lateral, and over it through the hole in the bar at the point where it rests on the lateral, and is now drawn through the rubber band which has been tied opposite the molar. The rubber is stretched to the full length of the bar. The cuspid was also drawn outward on the same bar by boring a hole directly opposite, which was made to twist the cuspid as well as to draw it outward.

Fig. 10 is the same bar applied to Fig. 12 for drawing out both superior laterals and expanding the arch. The right cuspid was just emerging and the first bicuspid was clasped. The ligature with a slip-loop was carried over the right lateral, coming up from its distal side and through the hole in the bar at A, and tied to the rubber band near the first bicuspid. The left lateral was ligated the same way, coming up through the hole at B, which is over the center of cuspid. The ligature pressing the left cuspid backward was tied to the rubber band at C. Where the bar is too short to stretch the rubber band, it can be lengthened on one side of the clasp or carried back to the right bicuspid.

(To be continued.)

ENFORCED CLIMATE AND DIET AS AFFECTING THE TEETH.*

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All problems relating to a solution of the causes of the decayed teeth of the human race are worthy of most thoughtful consideration.

More particularly should they interest us, as the object of our calling is especially for their care, preservation and restoration.

In offering to you this humble tribute of thought, it is my hope that it may awaken an impulse to search with greater scrutiny for causes hardly yet investigated and certainly not yet brought under universal consideration.

If I begin by saying that harmonious physical surroundings and harmonious diet with proper heredity should produce perfect men, women and children, you will probably agree with me; and will say that this result will follow as naturally as cause and effect; that is, given healthy, prenatal and antenatal conditions there would be universal health and no such thing as decay of the human teeth.

From this logical conclusion I think there is no appeal unless we believe ourselves and the creative power to be illogical, and that our reasoning powers are given us to confuse, beguile and perplex us instead of to comfort, strengthen and sustain us.

Following this line of thought let us see where we shall be led by it.

Let me repeat the conclusion, that harmonious conditions will bring forth the well-developed undiseased man; but as we look about on every side what do we see? Instead of a race of idealy perfect beings, only an undeveloped and largely a physically and mentalty diseased race, and as we know that man has made but few of his mental and physical surroundings, we conclude that his surroundings have mainly made him; and that they must be to a large extent inharmonious, for had they all been harmonious perfect harmonious beings and healthy races would have been created from their influences.

The general thought that runs through Christendom and has given tone to our ideas and a bias to our minds has been taken from the Jewish and Assyrian theologies, how much farther back in time no one knows. It is of a perfect creation—a tempter, a fall, and a degenerate race because of that temptation and fall.

^{*} Read before the New Jersey State Dental Society at its Eighteenth Annual . Session held at Asbury Park, July, 19, 1888.

Were this doctrine as accepted entirely true, there would be no need of farther search for primary causes; but true science, I maintain, starts from the beginning of things in its investigations; therefore, no old document, wherever it may be found, should be accepted as true without close scrutiny. Its theories and probabilities should be discussed; its facts brought out and weighed in the full electric light of modern science before judgment should be rendered on it. The wise men of to-day differ from the wise men of centuries past, in that they have found thousands of new facts to guide them to their conclusions.

It has been considered scientific to say that man is an omniverous animal; but, glancing at the structure of his body, it becomes a question of whether the condition in which you find him as an omniverous eater is a true and normal one.

Certain well-known facts regarding his physical formation, such as the long intestine, the delicate and non-pointed teeth, the weak-muscled jaw and its lateral motion, which belong solely to the graminiverous animals, have led many profound students of physiology to believe that normally man is not an omniverous eater, but one in whom the frugiterous and graminiverous instincts prevail.

If the race of man is not per se omniverous, and eats omniverously, such a condition must bring about deplorable results from the violation of one of the primary conditions of health; that is, strict obedience of the physical laws of diet.

Let us now glance at the condition of the earth and its relation to food supply. A new-born child is not responsible for the country into which it is born, whether it is Lapland, Siberia, Brazil or Honduras—whether Italy, France, the United States or elsewhere; but it is evident that if born among the Esquimaux its diet after it leaves the breast cannot be like that of the child born in sunny France or in Brazil. There will be found no whale-blubber in the French Alps or pineapples in Lapland; yet the child born in either country will live and grow to maturity and old age.

Man is the choicest product and the most helpless of God's creation at birth; but finds protection provided for him in the parental instincts implanted in his progenitors. Launched amid wild and savage beasts, weak, feeble and naked, he finally feeds, clothes and defends himself in spite of his delicate organism by the cunning of his brain and hands, and subdues the forces of nature to his uses. Before he learned to build houses, if there was

such a time, he hid himself in caves to protect himself from storms of wind and rain, or he wove the branches of trees together for a habitation, or he climbed into a high tree top, where no wild beast could follow, for security and a home.

As we go back in the ages, assisted only by the light of the imperfect science of to-day, we find phases of man's existence that are clouded in doubt and darkness; and generations will probably have to study problems of geology, cosmogony and anthropology before the question of what is our normal race condition will be positively settled; but, personally, I am satisfied that the earth's condition at a time not beyond tradition was very different from the present in its relation to food supply. That the earth at one time was covered with verdure from pole to pole; that the elephant and the mammoth dwelled once in the umbrageous shades of the polar region and meandered amid its giant trees, hardly admits of a doubt. From the nature of its vegetation, the remains of which are still found, the climatic temperature must have been mild, and a more equable climate extended over the whole earth than at present exists.

Since that period, at some unrecorded time, an era of intense cold has passed over the earth. Whole continents have been buried in unmeasured depths of snow and ice. Geologists call it the "ice age." From the north pole to the equator, adown the valleys of Labrador and adown the valleys of Brazil alike, have moved the ice glaciers. The fearful cold winds have utterly destroyed all the vegetable and vegetating food for man, except, possibly, in some of the now called torrid regions. Doubtless the race was depleted; doubtless cold, hunger, poverty and death reigned everywhere, and the wild beasts, made doubly savage by famine, preyed on the living and the dead.

By what tremendous catastrophe or cataclysm this event came about we do not know. How many ages poor humanity wandered over the earth in a half-starved condition no one knows.

Ignatius Donnelly, in his interesting book, entitled "Ragnarok," theorizes that some cometic body or disrupted planet, coursing through the immense spaces of the heavens, came so near as to rain showers of boulders, stones and sand on us in immense quantities, and heated the waters of our oceans and rivers so hot by its contact that immense quantities of vapor were carried into the upper heights of the sky, and falling again, as fall it must, in snow and cold rains, the temperature of our little earth, only 25,000 miles in circumference, was so thoroughly cooled that it

has not yet returned to its normal heat by the slow warming process of the sun's rays.

It is the fashion of our day to cry down Donnelly on account of his attempt to prove that Bacon was the author of Shakespeare's plays, but we must not forget that it takes an ingenious and a searching mind to make a plausible plea to that effect; and no man can read "Ragnarok" without admiration of the thought and research spent by the author of that remarkable work, and I commend it to you as highly interesting, and a book to awaken thought and investigation into world problems.

The immense littleness of our globe, in comparison to the greatness of some of the planets and fixed stars, should teach us all to be humble. Vagrant wandering comets have been chronicled whose sizes have been so large that our earth would make but a scarcely perceptible pinhole in passing through the immense train that swept by, measuring a hundred million miles in length.

Taking, then, our human anatomy; taking man as a fruit-eater; as a nut and a grain-eater; as a lover of the beautiful things that smell sweet and are luscious—a lover of strawberries and grapes; of those fruits that delight the eye—the peach, the pomegranate and the orange; that are sweet to the taste, as the date, the fig and the banana, as well us many tropical fruits unknown to us here. Take him as a lover of beautiful flowers that nourish the blood as well as the mental organism. Take him even as a lover of eggs and the birds that lay them, as a partial flesh-eater, if you please, and decide, as you have a right to, that this combination of bread and meats and fruits with a genial climate will give healthy blood, bones and muscles.

Put this organism, this spiritual being—by that I mean a being with high instincts and tastes, soaring upward, restless, desiring cultivation, and not satisfied with a merely animal life—on an ice plateau, with ten months of winter and four to fourteen feet of snow and ice, with a diet of raw fish and clams and nothing else, and what would become of him? What sort of a grand man would he make? Why like the present Esquimaux, a man without influence, power or nationality.

Let us look at the reverse. As we approach the bread-caters, notably the Teutonic and Slavonic races, how rapidly power increases, how rapidly intelligence increases, how ingenuity thrives, how muscular the men grow, how active their brains grow, how the nation and the arts of civilization thrive.

Starting, then, at a point of time more or less remote, with a

salubrious climate and a bountiful, fruitful vegetation, what would be the gravitation of the race towards the destruction of beasts and the feasting on their carcasses, or towards the cultivation of the beautiful fruitage that begins in leaves and flowers and ends in tempting clusters of grape and grain? Towards the latter, I think.

And the reason why I think so is from my observation of the present tendencies of our people. Picture to yourself the average diet of New England people two or three generations ago. It was of bread made of Indian corn, rye and occasionally barley and wheat, dry beans and peas, cabbages, squashes, pumpkins, parsnips, turnips, carrots and onions, apples and hard pears. For meats, beef, pork, poultry, mutton, wild game and fish. T ese were the principal foods of a family for nine months of a year. For sweetening they had molasses and a very little sugar; and for drink, apple cider, rye coffee, rum and water, milk, some genuine coffee and very little tea.

When "killing time" came, the family hog was slaughtered. A large portion of it was put in salt brine; some parts of it were smoked and some made into sausages. It was the same with the cow or ox that was killed. A part was sold to friends and neighbors and the remainder corned, and a good stock of salt codish was laid in for winter's use.

All this is well known, but such great changes have taken place since then that it is worth while to dwell a moment on them Wheat, finely ground, has largely taken the place of Indian corn Oat meal is largely used where once it was not. Rice, sago, tapioca, and various preparations, as farina and grannum, are consumed. Potatoes are enormously used, where seventy-five years ago they were hardly known. Tomatoes, now in general use, were then unknown. Numberless varieties of all the vegetables of those days have been added to our list, such as the horticultural seavey and Lima beans, toothsome peas, new varieties of sweet corn, turnips, onions, squashes, cauliflowers, celery, etc., etc. Varieties of apples have reached the hundreds, and pears also. The tiny strawberry has grown to be a mouthful each. The Lawton Hackberry, found in Dorchester, a part of Boston, is a wonder in size and flavor, and is not beyond the ability of the average family in cost. The cultivation and production of fruit and vegetables in our orchards and gardens is enormous, and as our seasons are not long enough to supply the demand, we start our crops largely under glass; and we make our fruit season longer to the consumer by "cold houses," where we keep it into the winter. Ready transportation brings us strawberries from Florida and from Nova Scotia in the same spring and summer months.

From the South early spring brings us all kinds of young venetables, and summer follows with early fruits, and then melons and peaches, and still the demand increases year by year. From foreign lands come grapes, figs, oranges, bananas, dates, prunes, olives, lemons, and nuts, increasing in quality and quantity every season.

These give our people a different and, I believe, a better diet than formerly. Add also to this the immense quantity of canned fruit and vegetables that are used, and we can see readily that the dietetic change that has taken place, and is taking place in our people, is very great and remarkable.

The diet of former years had its result. Transportation was difficult and slow, and as the winter progressed, dinners as well as as other meals were monotonous, being largely of corn-bread, salt pork, salt beef, salt fish, and winter vegetables. Cabbage, beets, carrots, and parsnips were boiled with the meats. Pork was fried and hashed with salt fish; but down they all went. Hard work made it possible to digest them, greasy as they were; and they washed them down with a daily ration of diluted rum and molasses, and plenty of cider. Such is a rough, but I believe a true sketch, of a former New England diet.

One of the great departures from earlier diet lies in the less use of fat. Economy was a habit and a teaching of the people, and nothing was to be wasted, and so in order to eat the whole animal they made suet puddings, and often flavored them with wild tanzy weed. They gloried in fried pork, and fried beef, and fried doughnuts. Every thing was rich with gravy. Meat was minced with condiments, with a good proportion of suet, and made into pies, and the very word *rich* indicated to the minds of the people something greasy and fat, and they thoroughly agreed with:

"King Arthur who a pudding did make, And stuffed it well with plums; And into it put great lumps of fat As big as my two thumbs."

Contrast the ideal of those days with the charming cookery of our best hotels and houses of to-day. There everything is free from that kind of grossness. What our people have taken from one side they have placed on the other. They have banished the fat and put the fine growths of the summer and autumn in its place, and this is, I believe, a natural tendency towards the desirable and normal diet; and with this banishment has vanished the severity of a large class of diseases, and notably with gross feeders, the gout.

But we may ask how is it that man has the almost universal flesh eating tendency if he is not normally a flesh eater? We find him a promiscuous feeder and yet my idea is that he is not naturally omniverous; but if not, where did he get his omniverous desires.

The reply is that his surroundings have made him what he is, or rather his past surroundings have given him the tendencies and habits that still cling to him and yet remain, it may be, for centuries longer.

Believing as I do that the conditions under which the human race found itself during the age of ice, the succulent vegetation was blighted and humanity was fast drifting back towards savagism from which it may have originally sprung, there must have been a time when little other food but animal could have possibly been obtained and the human race had to eat what it could get to eat.

The severely cold age must have existed many centuries and man must have gone as far from the normal condition of diet as the climate varied from its normal condition of food production.

Had humanity, had human beings been beings of the lower order like cattle or sheep they would have perished "like cattle," as we say, from the fact that the lower races have not the protection placed around them that man has, and are not able to withstand marked changes of diet. But man with his wonderfully adaptive digestive apparatus by becoming omniverous, or, in other words, by feeding upon any and everything he could find to eat, fish, flesh or fowl, anything flying in the air; anything living in or on the earth; anything in the waters or on the shores along side of them, kept alive the human race to fulfil the destiny appointed for it. And it survived, when many of the lower races perished forever.

Mankind is slow to move out of the ruts it gets into, be they what they may, of kingcraft, of priestcraft, of witchcraft even. It rocks its babies in the same kind of cradles it did hundreds of years ago; its household utensils are the same; its traditions are the same, and likewise its diet is the same. Only among the pushing bread eaters, the restless and ambitious white races forfeited by a destructive religion has progress been made, but that progress comes slowly. Man, as has often been said, is a creature of habit, and there is a constant contest between the forces within with their normal tendencies and the habits forced on him by his outward surroundings.

We all know what is the normal diet of an infant as it lies on its mother's breast, in the first few months of its life; but what will circumstances force on it as soon, or even sooner than it leaves its mother's milk? It may be its mother gives it a meat-bone to suck; or may be it fills its mouth with blubber oil; or it may be she gives it oatmeal or rice, or potato and garlie; and for its drink she gives it, may be, cows' milk flavored with coffee, or gives it a sip of beer "to make it a German," or a little tea because "its mother likes it," or the sugar from the bottom of the wine-glass, because the "father likes it."

And as the child grows older, its mother prepares its food for it; and she greases its potato, and she salts its potato, and she peppers its potato. She mustards his meat, and fries him a doughnut, and gives him some mince pie. She sets his morning cup of coffee before him only a trifle weaker in strength of decoction than his father's, and gives him hot batter cakes and fine flour bread, soda raised; and does all she can to make a man of him.

And where will he land? As a man of diet on his father's and mother's platform. Only he will have poorer health, poorer teeth and a poorer stomach; and at the end of a few years will have assisted the good doctor towards paying for his carriage, or the good dentist for filling his honeycombed teeth, or the good sexton for his children's funerals. Tell me, if you can where, in all this do the inherent instincts of his nature have a fair chance to show themselves? And tell me also if there is not here some chance for a science of diet to interfere!

We need science at the base of diet, and its proofs must rest in physiology, and not on the habits of men that may be forced on them by their various surroundings. In anticipation of this seience, I suggest this axiom as one to study—one to prove or disprove:

The normal diet of man will keep his teeth clean without assistance from powder, soap or brushes.

If this is so, we have something to guide us towards the great end we strive for: a knowledge of a basic fact. The animal, led by its instincts and given little power to vary from a strict course of diet, must obey, and is found everywhere in its native hannts with excellent teeth, and largely so in its dome ficated state. Its breath is sweet, and it pays no doctor's bills. Why should not man't eeth be good, living on a proper dist?

I will formulate another axiom: All food even should be soluble in the saliva.

That is, it should be so soluble that, after eating, the tongue and the movable muscles of the mouth, with the saliva, shall be able to wash and brush the teeth free from all sticky particles of food by their automatic motions.

This seems, on the face of it, to be true; because it is so with all the lower animals without exception. Even your horse, your dog, or your cow, stalled as they may be, hardly present an exception to it.

I do not now propose to follow out the results of the application of these maxims to daily life; but they will debar from use considerable of the food now consumed, and, as I believe, the portion that is unnecessary and unwholesome.

As surely as you know the dietetic habits of an individual or a race, so surely should you be able to diagnose their condition of progress. Take our savage tribes and analyze them. Raw or half-cooked meat, pounded maize, a wigwam, a few pine-knots for light, and a pipe of tobacco may be enough for them; but it is not enough for me.

We must be satisfied with our condition or not satisfied. If satisfied, it is doubtful if progress will be made. We are not generally contented. The element of dissatisfaction is placed in our minds. That is our warrant of progress. And if we reform our diet, we must move out of our old habits. One by one will they be swept away, and we must move out of the lower habits into the higher.

Can a man be made savage and cruel by his diet? Can he be made stupid by his smoke? Can he be made nervously susceptible by drink? And by this combination of habits be ready to commit all petty meannesses on other individuals? If diet and drink have their effect on individuals, why not on a nation, which is but a congregation of individuals? And if it can be made savage, brutal, cruel, and unjust by its diet, why may it not be made courteous, kind, and just by another diet? If it, or we, can be made unhappy by a diet, why may we not be made happy by a change of diet? If our diet does not develop us, why may not another diet develop all our fine physical, and spiritual instincts? And in correlation to this, why if our diet and habits produce decay of our teeth, may not another diet better develop and conserve the teeth?

You may say that this view is not very encouraging, that it will be centuries before the time that men will learn to live aright, and avoid the sweltering habits we all know to be wrong, much less avoid those about which there are chances for varied arguments,

and to wait until we again have an equable climate, before we can get into normal conditions, is a hopeless wait, and that the most we can do is to expect that in some remote era of the future, such a thing might be possible. Nevertheless, I say, there is no reason why we should not turn our faces and our arguments towards the right way.

For thousands of years we have been travelling towards the right government; murderous kings and nobles, and torturing priests have stood in the way. We look down the vista of centuries and our eyes can see no end to the cruelties that the privileged classes in the past have perpetrated; but were we at the other end of the vista, we should see it widen and broaden into this great and glorious republic, the culmination of the theories and work of the past students and patriots of unnumbered centuries.

For hundreds of years we have, as the representatives of the Christian idea, been prophesying the reign of an era of peace and good-will on this earth. Has it yet been accomplished? Is it now time to give up this idea as futile? No! I think I hear you all at once exclaim: We do not yet despair of that result.

And shall we despair that only in the dim future can reasonable men expect to find the era of perfect forms, harmonious characters and beautiful teeth? No! Our duty is to press onward towards the highest mark of our high calling, working both as present benefactors and as aids towards some more glorious era on this earth that we cannot yet see, but can dream of, hope for and desire for our children and our children's children. In doing this, let us turn towards the true diet, study well its conditions and its promises; study well the laws that produce health of the body and the mind. The glaciers or rivers of ice once swept down the torrid Amazon valley—once went sweeping over the whole eastern slope of this continent. Once, also, the deep waves of the ocean rolled in thunder tones over the spot where we now stand.

In some way or other change will take place as change has taken place. How and when I know not. Out of the fiery volcano and the deep sea has come arable land. No longer is this continent buried like the polar regions in everlasting ice, but verdure and blossoms abound. If the promise of the past has not been broken to the ear or to the heart, why may not the promise of the future be fulfilled also; and the denizens of this earth, slowly but surely, placing hand in hand and joining the great brotherhood of science, push their way up into the regions of peace, purity, justice, health and happiness?

Reports of Society Meetings.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

NOVEMBER, 1888.

ESPECIALLY REPORTED FOR "THE INTERNATIONAL," BY I. G. BAUMGARDNER, D.D.S.

Discussion on Dr. Truman's paper, entitled "Shock in Relation to Dental Operations."

Dr. Chupein—I quite agree with Dr. Truman in his views about the worn-out feeling which we frequently have after protracted operations, as I was suffering from this kind of "shock" when my day's work was ended. We often tax our strength in attending to more patients than we are able; yet, when people come to us suffering, and seek relief at our hands, we are prone to do this in the desire to do all we can for them.

Dr. Sudduth—There is one interesting phase of the question to which I have given considerable thought, and that is the peculiar effects of psychical influences. The mind certainly has a marked influence over the body in the performance of its functions. I remember, when studying in the hospital at Vienna, the case of a servant girl who came to the hospital complaining of a tired feeling, and who for four weeks proved an entire enigma as to the nature of her disease. Neither did the autopsy reveal anything. Our only clue was her history as recited by her friends, which was that two years previous she had been led astray, but had borne up, under promise of marriage, until within a few days previous to her admission to the hospital. Her decline and final collapse resulting in her death was attributed to the news coming to her notice of the marriage of her betrayer to another woman. Another case was that of a young lady who received word of the death of a near relative while at the dinner-table, when she had eaten heartily. Immeaiately the function of digestion was stopped, and the food remained in her stomach undigested for a long time, and it required a regular course of treatment to relieve the system of the undigested food. That was an instance of the mental action inhibiting the function of digestion. The third case occurred in my own family. I filled some small cavities for my little girl at my old office in Bloomington, Ill., this summer. They were quite sensitive, but she was brave, and while they were only filled temporarily, yet the strain was such as to cause an appreciable rise in temperature that evening, although

the child was perfectly healthy. In practice, I never made an appointment for longer than one hour or an hour and a half. The change of patients is refreshing to the operator, and not so tiresome when confined to short engagements. There is a magnetic interchange from patient to operator that must be taken into account.

Dr. Thomas—I was greatly interested in Dr. Truman's paper. particularly so, because he recognizes the effect of shock in dental operations. Many dentists, formerly more than at present, seem to have no consideration, personally, for the patient, and I can endorse heartily Dr. Truman's suggestion that the time of sittings be shortened for patients of certain temperaments and nervous conditions. My specialty, as you all know, is extraction, and I have repeatedly had patients present themselves, who were amply able to pay for dental care, and who have spent large sums upon the preservation of their teeth, and yet their mouths were in a deplorable condition. They would come with the full determination to have their teeth extracted as they became troublesome, and declare that under no circumstance would they submit further to the strain and shock of dental manipulation. I know of several instances, but one in particular, of a young lady who, every time she went to the dentist for filling, would go home and remain in bed from three or four days to a week. I am happy to say that this difficulty has been largely removed since the more general introduction of plastics for fillings.

Dr. Truman speaks of the effects of shock in extraction, which we all know is a serious matter; and when not using an anæsthetic it is, no doubt, better to proceed cautiously, and do no more than the patient ought to bear; but when nitrous oxide is used. I do not agree that division of the operation is advantageous. I sometimes have patients sent to me with directions from their dentist or physician to extract only one or two teeth at one time, instructing them to return in a week or so to have a like number extracted, and so on until all that are condemned are removed. I do not think this is the best course. When a patient is under an anæsthetic, it does not matter whether you take one or a dozen out; and it has been my experience that a patient will endure the larger number all at once a great deal better than by dividing. The immediate effects show very little, if any, more symptoms of shock, and the relief of mind at having the operation completely finished adds a buoyaney to their nervous system which hastens recovery, while, on the other hand, they have the inconvenience of the sore places, and the constant dread of having to go through the ordeal again. This causes

such depression that I have found it advisable more than once to defer extraction until conditions became more favorable.

This would tend to demonstrate that preceding nervous excitement and dread in anticipation of an operation are as depressing to some nervous conditions as the actual operation.

Mention is made of a case cited in the American System of Dentistry of a robust man declining rapidly in health after taking nitrous oxide. It is said that he lost forty pounds of flesh in a short space of time, and finally died of diabetes. I doubt very much that the gas caused the disease in his case. If it will do so in one, why not in another? Just think of the thousands upon thousands who have now taken nitrous oxide, and how extremely rare is a charge made that it has acted injuriously. I have in my own practice had a few complaints of supposed ill effects, but I have never met a case which was not readily and satisfactorily accounted for otherwise.

Dr. C. N. Pierce—I have had great pleasure in listening to Dr. Truman's paper. We cannot too strongly urge the necessity for short sittings in our operating chairs. One hour to one and a half is my limit, except in very exceptional cases. Protracted operations not only weary, but exhaust, the nervous force of both patient and operator. The essay tells the story plainly and emphatically, and its admonitions are valuable to our patients and ourselves.

Dr. Faught-The paper of Dr. Truman is certainly a valuable addition to our literature on the subject, and is one that concerns both our patients and ourselves. In discussing the subject I will divide my remarks into three heads. First: Shock to those under operations. - We are too prone, I think, simply to place patients in the chair without administering where particularly indicated, as is our right, medicinal agents both before and after the operation for the reduction of the nervous strain. I have been at fault in this myself, but for the past two years have given the matter careful study. We ignore the powers which lie in the course of proper medical treatment, and rely too much upon the supposition that the patient will recover physiologically. Second: Shock to those under anæsthetics.-Dr. Truman spoke of extracting six teeth at a time—that is all very right. In my opinion, we have no right to extract any teeth in Philadelphia without first recommending the patient to take the gas as administered by our skilled specialists. It is a grave question whether we should, as practitioners, do otherwise, knowing patients will suffer from it, when we have a remedy for them. In Philadelphia this branch is reduced to a science, and we do best for our patients when we recommend them to the services of a specialist. Third: Shock in regard to ourselves.—The symptoms of this are only too familiar to us. There is, however, one boon we too much neglect; that is sunshine. We enter our offices with lights before the sun is up, and leave it after it has set, thus losing the stimulating action upon the pores and general system. We take the shady side of the street, and avoid the sun whenever possible. Out-of-door exercise may be indulged in with great benefit; but best of all is sunshine, which we as dentists sadly neglect. It is our duty to sun ourselves more.

Dr. Guilford-I am pleased to find that Prof. Truman has brought this important subject before us, and that he has treated it in such a scientific and practical manner. It is a matter that largely concerns both our patients and ourselves. Fortunately we do not confront the condition, so far as our patients are concerned, nearly so frequently as we formerly did, and this is due to greater enlightenment on our part, together with improved methods of operating. Dr. Thomas thinks that it is largely due to the greater prevalence of plastic filling; but to my mind the change in the methods of tooth-restoration in general practice have had quite as much to do with it. Where the operator formerly spent from four to six hours in building up a tooth-crown with gold foil, he now makes the hollow crown in his laboratory, and simply mounts it in his office. Most of the work of restoration in its various forms has, of late years, been transferred from the office to the laboratory, with a corresponding physical gain to both patient and operator.

Dr. Thomas has also spoken of the use of nitrous oxide gas as a preventive of shock. There can be no question of the fact that an anæsthetic, especially a mild one like nitrous oxide, will generally prevent shock that would have occurred without it. Many years ago a girl came to me to have a tooth extracted without gas. The tooth being a lower one I placed her in an ordinary chair, so that I could stand back of and over her. Before I had grasped the tooth she was taken with an epileptic fit. After recovery, I placed her in my operating chair, administered the gas, and extracted the tooth without any unpleasant results.

The question of shock also has its subjective side from a dental standpoint. We ourselves are subject to it in a mild form, although we do not like to give it that name. Instead of working until we are wearied, and then ceasing, most of us are apt to continue until we are exhausted. Our collapsed condition at the close of the day shows that our system has suffered from shock, and, where kept up

from day to day for a long time, cannot fail to injuriously affect us.

There is another form of "shock," to which the essayist has not alluded although he must be familiar with it: for it seems to be growing more prevalent each year. Its symptoms are: Flushing of the face, protrusion of the eye-balls, and a singular elevation of the eye-lids. In addition, the tongue and vocal chords are affected. causing the afflicted person to utter strange sounds and speak in an excited manner. There are some peculiar and characteristic features about it. One is that it does not always immediately follow the operation that was the occasion of it. It may manifest itself at once, or it may follow only after a considerable time has elapsed. Another peculiarity about it is that the effects of the shock do not always manifest themselves in the individual for whom the work was performed, although they often appear in some other member of the same family. When a child has been the patient, the shock is usually noticeable in the father; and its occurrence corresponds exactly in point of time with the arrival of the bill.

Dr. Bennett—I am very much pleased with the paper. This is a subject that has received too little attention. In operating we always inflict some degree of pain or excite the fear of it, the one being about as bad as the other when patients are young or nervous. Either pain or fear or both may produce some degree of shock or exhaustion. It is just as important with children to allay their fears as to relieve pain. The best thing we can do for many of these at the first sitting is to help them to get rid of their fears.

It is trite, but may be well to mention that the best means at all times to avoid shock and undue dread of the dental chair is to begin with the simple and least sensitive operations. We all know the good effects of first cleaning the teeth, especially with new patients. As for the others who may be fearful, or not capable of much endurance, we must, of course, depend on short sittings and a judicious use of remedies for sensitiveness in any of the tissues invaded by our operations.

(To be continued.)

NEW JERSEY STATE DENTAL SOCIETY.

JULY, 1883.

ESPECIALLY REPORTED FOR THIS JOURNAL.

Discussion on Dr. Codman's paper, Enforced Climate and Diet as Affecting the Teeth.

President Brown—I want to thank Dr. Codman, not only for the society, but personally. The paper he has read gives a clincher to the one which I had the honor of reading before this society last year; and I hope that Dr. Atkinson, who was to have opened the discussion of my paper, will open the discussion of this one.

Dr. Atkinson—It is difficult to add anything to the trend of the research and of prophecy that we have been listening to. I have nothing but commendations for the general principles of the paper and for the statements made; and the only criticism I have to offer is that the verbiage does not always fit. A musular brain is that which is not known to my anatomy; and I would suggest that muscular be changed for robust, or something that would more nearly comport with the magnificence of the portrayal and the beautiful correlation of aphorisms that indicate a research very uncommon.

That we all do live upon something that he has referred to, but not named, is generally accepted, I think, by all thinkers; and we are near the time when such deep philosophical disquisitions shall not only be tolerated, but received with delight and in some measure comprehended.

But all that is swallowed up in the immediate question, what shall be the next step; and the fact of each individual having to take the step that shall best comport with his particular environment, and that these communities that have been referred to may be sufficiently alike to walk together in obedience to the law that governs the food supply, and the preparation of the food when it has been attained, will enable us to come a little nearer to what is now engaging the minds of the so-called micologists, those who are studying the earliest embodiment of this power that has been so difficult to define, and the understanding of which is absolutely necessary to the comprehension of the question of food and nutrition. A late writer says that the function of the white blood corpuscles, the leucocyte in the mammalian circulation, is to eat the microbes that are inimical to the organization, and thus bring about a tolerable condition so that the other modes of the stored

radiancy may awaken the primal steps in the process of building and nourishing the organs of the body.

When, some years ago, a few inspirations were spoken of by your humble servant before a body of this kind they would say, "Come out of the cloud; talk practical sense; we do not want any of these vagaries;" but before they would be through they would refer to the very same relations that we are trying to unravel in order to understand what our duty is.

There was something said about honesty and a commercial age. Commercialism is right if you use it right; and so is every other condition if we only know how to meet it. But how do we know how to meet it if we do not agree in our understanding and interpretations of things by referring back to the power that produces them?

As to the earth being once clothed with ice, it is altogether unphilosophical and contrary to true evolution, the stages of which do show us a great many things that have been attributed to the Devil's Mountain, which, if we had such a mountain, we might have sympathy with him, and work as brothers together in our investigations, and know that we know so little that we ought to be ashamed to say that we have grasped the problem of organized beings and settled the question of embodiment of soul; because in every human soul there has been planted both intellect and affection: there is a sense of brotherhood and of righteousness; a sense of doing to others as you would be done by; and that is not what has been called in this paper physics. I wish to God the word physics could be expunged from our nomenclature. There is no physics without that which produces natural organisms. There is no organ without that which gives the lay-out for the organ. There is the spirit within it—though it escapes us when we are not able to do anything more than mentally grasp at itwhich is the doing power that reveals the truth to us.

I hope this paper will be discussed by the society, and all done that can be done to engage the stored radiancy that is somewhat obscured in it, so that we may be illuminated by an understanding of the laws that govern individual existences that have in them the intellect and affection that raises this question of morality.

Dr. Thayer—The important question raised in the paper seems to be: What shall a man eat thereby to have good mental and physical organization? I cannot give any better answer than that which is recorded in the Bible; where it speaks of that land which

the people of Israel were going to occupy as filled with corn and wine and oil, and flowing with milk and boney. If these are the things which were good for men to enjoy in those days, why not take the old Bible and settle the matter?

Dr. Stockton—Dr. Codman speke in his paper of the crude diet of the old New Englanders; how they lived on the plain foods of that time; and we know that they were mentally a grand race, we know what has sprung from them, but we do not know much about their teeth. I would like very much to learn something about them from the doctor. I consider this an important and practical question, one that brings us down out of the clouds to the comparative results and desirability of living on the plain, coarse foods used at that time, and the diet which we should have to-day. I doubt very much whether the race of to-day is mentally any stronger than they were in those old New England days. They were grand men.

Dr. James Truman-Mr. President, I was very much interested in the remarks of Dr. Codman, and I was glad that he brushed away all the old ideas that have been handed down through the books, and based his remarks entirely upon scientific research. He gave the opinion that food has very little to do with the character of the teeth as we find them. When I examine the teeth of those who live in the cold regions, as the Esquimaux, who live entirely upon a fatty diet, I find them of good character and structure; and as I pass to other regions, where the people live entirely upon a vegetable diet or a fruit diet, I find their teeth of the same general character as those of the meat and fat eaters. Also, when we exam ine the teeth of the early races of this continent, or in any quarter of the globe, we find the same character of teeth associated with the greatest variety of food habit. The question arises whether a meat diet or a vegetable diet is best for the human race. I hold that we may eat almost any form of food, but that we are not built for a meat diet. This is my positive conviction. I know that it is contrary to general opinion, and the shape of the teeth, especially of the canines, is cited in opposition to it. It is a fact that the human animal has comparatively smaller teeth than many of the herbiverous animals; that does not indicate a meat diet. We now live upon a mixed diet, but I think the time will come when the human race will refuse to eat anything that "has just died," as Dr. Atkinson puts it. To my mind the whole human race is gradually advancing from a coarse stage of existence, from a time when the flora and fauna on the earth's surface were rude and coarse. Yet that is an expression which we cannot properly use in this connection, because there is nothing coarse or fine in nature; but still there is a difference in the grain, not only in organized beings, but in vegetables that then existed; they were coarser in grain and coarser of organization than those of the present, and probably those of the future: and the reason. I think, lies in the fact that the food of those animals and vegetables was in a comparatively coarse and crude condition. The earth has been going through a refining process, as it were, and we find a different race of animals and a different race of men: and this change will go on until that condition which Dr. Codman has spoken of will come, when the earth will be peopled by a race of men and women who will not only not eat meat, but will probably be so spiritually improved by the better food taken into their systems that they will be an entirely different race from that which now exists. I believe that all nature points to that result. I believe that not only this earth, but the great series of worlds, every one of which is, or will be, peopled similarly to ours, must eternally advance toward the good in the refinement and elevation of the races which exist upon them.

Dr. R. B. Winder-Mr. PRESIDENT AND GENTLEMEN:-I can speak in commendation of this paper, as I should in regard to everything that involves earnest scientific research. That our race will eventually feed only upon grain and fruits I am very much disposed to doubt. That food stuffs have an influence, both upon plant and animal life, is a well-established fact in physiology. We all know the decided influence and effect of coloring matter in the food stuffs of animals. Whether meat or vegetable food stuffs is to be the food of man in the future is a question which the future alone can decide. That we are not at present intended to be strictly graminivorous, we have abundant evidence. I think, in the anatomy of man. All those animals which live exclusively upon a grain diet have a series of stomachs. Man has but one; and every animal with a digestive apparatus that is very similar to ours is omnivorous in its food habit, so far as I have gone in biological research. So, reasoning from analogy and from the anatomy of man, I could not arrive at any such conclusion as that the food of the race will eventually be grain and fruits only.

The question which Dr. Stockton asked Dr. Codman is a very pertinent one, and I would like to have it answered, because I have been told by much older gentlemen than Dr. Codman that there has been a change in the structure of New England teeth. I have been told that, over and over again, by our old and honored brother, Dr. Riggs, of Hartford, Conn. But to say that our food stuffs

control us is to go into a discussion of the chemical assimilation of food stuffs. The same food stuffs produce in different animals very different epidermic structure. The teeth belong to the epidermic structure, so that, while food has an influence, it does not control. We know that in the half-breed Indian, the child of an Indian mother and a white man, when there has been no change of climate nor of habits, and also no alteration in food supplies, there is a most material difference in the structure of the teeth. There we have to combat, the moment the chain is broken, that very troublesome thing, heredity, of which we know so little. I have given considerable thought during the past fifteen years to this subject, and there seems to be a debateable ground, where the facts rise and rebut each other, leaving you in a labarynth of mystery in regard to the matter, which, up to this time, no man has unraveled. There is not enough known about it to make much impression upon the general public. If we reason from analogy, from the food stuff which the infant takes, we would conclude that our diet should be animal as well as vegetable. If we are to draw any imaginary deduction from the character of the food which nature first givest to the child, we must inevitably come to the conclusion that man is not to be sustained without a certain amount of animal food. But take any avenue, and pursue it as you please in this direction, and you find rebutting testimony, and you are bewildered.

Dr. Bailey.—I have been very much interested in the discussion, and although it is a subject to which I have not given as much study as some others have, yet I have considered it somewhat. Dr. Winder has expressed very fully my thought upon the general subject of a mixed diet.

Some of the points made by Dr. Codman in his paper have raised a question in my mind. He speaks of certain animals presenting perfectly clean teeth, from the fact of their food being so simple that the tongue and the fluids of the mouth are able to cleanse the teeth. We find that condition in animals in their natural state. The teeth of the carniverous animals are as clean as the teeth of the herbiverous animals. They are as clean as the teeth of omniverous animals. All animals except the human eat their food uncooked; and I think the soft, glutinous matter of cooked food that sticks to the teeth has much to do with their decay and loss. If we take the human animals that present strong and clean teeth without the aid of tooth-brushes or powders, we find that they live very much in a state of nature; they are not

congregated in cities or villages; they are not busied with intellectual pursuits, but they live an out-of-door life. The Rev. Mr. Murray, when he hailed from Boston, gave us some account of life in the Adirondacks, and he tells a story of a young man who was so debilitated when he went there that he could not get into that wild country without being carried, yet, after a residence of a few months there, he was able to endure the most fatiguing expeditions on foot without aid. When the young man who is debilitated by city life and heredity goes back to a more natural state of living, he finds that his body is built up, so that it can perform its natural functions. And it is because of these facts, which constantly come to our knowledge that I am a great skeptic in regard to the doctrine that our food has anything to do with the building up of our spiritual nature. We know that all parts of the body, the brain as well as the bones and muscles, are built up by the food which we eat; but I doubt very much whether the spiritual nature of man is so built up or changed, except our habits of taking food become gross and animal. There is a tendency to the animal nature and to the spiritual nature; but those tendencies are governed more by our habits than by the nature of the food which we take.

Dr. Sudduth—I would like to say a few words in regard to the connection of food supply with the cleanliness of the teeth of animals. How about the teeth of dogs? They are generally clean. They have the same cooked food that their masters have, and yet there is no decay in their teeth. There is only one article left out of the dog's diet, and that is sugar, that we take ourselves.

The emission of sugar makes the only difference between the food of the dog and that of his master. Now, from sugar comes fermentation; and decay is without question the result of fermentation and the production of lactic acid. The difference in the condition of the teeth of man and the lower animals is largely due to that difference in their food.

Dr. Watkins—Dr. Sudduth has spoken of dogs' teeth being always clean. I have noticed that the dog which is made a pet of and kept in the house and fed from the master's table invariably has a bad breath, and I have frequently seen tartar on their teeth also.

President Brown—Last year I wrote on this same subject myself; and I expected Dr. Atkinson to pitch into me, but he did not come. Now he makes the point that we should look at our organization to see what kind of food we should eat. That is out of the clouds. The position that I took in my paper was that we should try to decide this question by looking back to the natural or

original food of man, and not by what we see to-day. In the glacial period the food of man was changed. I think there is no doubt but that before that age it was a fruit diet. It was then changed to an almost carniverous diet; and as the earth has changed we have become omniverous. The question resolves itself whether we are living correctly as omniverous animals or whether we should be fruitiverous. Dr. Winder says graminiverous animals have several stomachs, and that therefore man, who has but one, cannot be considered a graminiverous animal. I have never heard anybody claim that we are graminiverous, but it is exclaimed that we are naturally fruitiverous. In comparison with other animals we of course come nearest to the ape; the anatomy of the two is almost exactly the same; and if we take that as an example, the argument is surely in the direction of the fruitiverous theory.

Dr. Ottolengui—Dr. Watkins is right in claiming that the dog loses his teeth just about the same as we do when fed upon the same food. I have in my house a pet dog that lost his six molar teeth from pyorrhæa at about two or four years of age. It seems to me that the men who make a business of breeding dogs have really advanced to a very high point of knowledge on the subject of breeding those animals, and the perfecting of their several qualifications. They can produce almost any kind of a dog they may want. In the first place they pay a great deal of attention to the matter of heredity.

The matter of food supply has also been carried to a fine point by the breeders of dogs. The dogs are fed upon only one kind of food, and that is dog cake. It is not at all unpalatable to man. It is baked very hard and the dog is made to eat it dry. It is made of ground bones and a soup made of beef meat, and, I think, corn meal. Dogs fed upon that after two months will show a very marked improvement in their coats. They are fed only once a day, and are then given all they want to eat. I know persons who follow the same habit of eating only once a day and taking food that requires considerable mastication.

Adjourned until 8 o'clock P.M.: Dr. Codman's paper to be taken up for discussion.

THURSDAY EVENING SESSION, JULY 18, 1888.

The roll was called by the Secretary.

The discussion of Dr. Codman's paper was taken up.

Dr. Stockton—We know that a great many people, when they come to this country from foreign countries, have very good teeth,

and that in a few years after their arrival their teeth melt away. Is that due to the influence of diet, or to the climate of this country? Can Dr. Codman answer that question?

We know that the teeth of children here require more care between the ages of 10 and 20 years than at any other period. We are also told that the teeth of people who come from other countries, especially the peasant class, do not decay after they have been here until between the ages of 20 and 25 years. What is the reason of that? I would like an answer to this question, also, if the doctor can give it.

Dr. Codman—I am not able to answer Dr. Stockton's question as to whether the diet of the New England people, which I claim has improved, has had its effect on the teeth; but I think we all agree that whatever produces better constitutional effects produces better teeth. And I think dentists are hardly judges on the question of whether teeth have improved or not, because we see the decayed teeth and not the good ones as a rule; the best teeth keep out of our offices generally, and we are not so good judges of that perhaps, as some outside individual might be. I cannot say that the teeth of the New England people have improved in the last sixty years. I do believe that the diet of the New England people has had its effect, and that the consumptive tendency has been checked. There are not so many consumptives as there were in the past. And that is as much as to say that the food they eat is better assimilated.

With regard to foreigners coming here with good teeth and having them decay soon after they get here, I think possibly there is an error there, and that when they come here they only think they have good teeth when perhaps they have not. I find servants oftentimes coming to me with good looking teeth, which are really decayed, and it is only a question of time when they will come into the general average. You know also that there is a very wide departure when they get here, from their European diet. Nearly all the Catholic population of Europe are limited in the days when they may partake of animal food; one day in every seven it is prohibited, and there are six weeks in Lent when they cannot take it. Further than that, there are those who cannot get animal food, neither can they get sugar, tea, coffee, etc. I have been told that in some parts or Germany sugar is so rare an article among the common people, that when they get a piece of it they carry it upon a string and each one of the family takes a lap at it. Here instead of considering it a luxury seldom tasted, they go into a barrel of sugar with savage appetites, and they eat it plentifully as well as other things which they were not accustomed to in their own country, and that unaccustomed food produces a disturbance of the system. Even the simplest things taken by a person that is not accustomed to them will often cause disturbance to the system; and whatever disturbs the normal condition of the system has its effect upon the tissues.

Something has been said about dogs, and the question was answered pretty fairly, but I have a patient who says that when his dogs are in the country they never have any tartar on their teeth, but when they come to town and live again on the food from the family table their teeth become covered with tartar. The reason of that is that in town they have no bones to knaw while in the country they scratch and root around and keep their teeth clean.

We must rid ourselves of the prejudice which is abroad among scientific men in regard to the difference in foods. There is not a great deal of difference between the mutton which you eat and the vegetable food which the sheep eat. The difference is mainly that the sheep ate the vegetable food first.

It was not many years ago when it was thought to be almost impossible for a person to live without animal food; the man was thought to be crazy who spoke of such a thing; but as our observation increases our ideas advance, we know more of the habits of other nations, and we find that some nations live almost entirely upon vegetables and fruits. We also know that some of the strongest people who have lived in the world, and who live on the Mediterranean, would take a package of three to six hundred pounds and trot off with it on their backs over the country, and they eat very little or no meat. The Japanese boys will take a lady in a chair and trot away at the rate of six or seven miles an hour, and they live almost entirely upon fruits and vegetables. But my idea is not, as some gentlemen have suggested, that our normal diet is grain, but the man is intended to be fruitiverous. Nature hands your fruit to you in the most beautiful shapes, such as the peach, and the plum, and the walnut, which are held out to you by the tree, and they are very tempting and very wholesome foods. I thank you for your kind reception of the paper, and I am pleased to be with you on this occasion.

Subject passed.

EVENING SESSION.

Dr. Sudduth showed with the magic lantern a large number of photo-micrographs of sections of the tissues of the lower animals

in various stages of embryonic life. He prefaced his remarks with a graphic description of his idea of the beginning of life on the face of the earth.

After describing the pictures shown, Dr. Sudduth said: "In showing you these various stages of development of life from a microscopic point of view, I have tried to bring out the idea of the separate entity in cell life; the history of the development of the individual is simply that of the development of the individual cell. The ova is nothing more than a separate cell that has the power of reproducing itself. It exemplifies the division of life in the cell. All the changes of the body spring from these separate entities that we find here represented.

"All change must begin in these ultimate principles. We call that the cell an ultimate principle because we do not know any other. These cells spring from pre-existing cells. The de novo origin of life is impossible. The only way in which life can be developed is from pre-existing life. I want to call attention to the fact that the green plant was the first point in the development of life. I believe the green plant was produced by creative flat. The development of the green plant de novo is also an impossibility. One life descends and blends into the other life. Man is a creature of heredity and environment, subject to the changes and vicissitudes of life, and his nature is changed and modified by the circumstances under which he exists.

The question of diet was brought up to-day. We are creatures of environment, but we have the power of modifying our environment to a greater or less extent. That man is changing all the time cannot be questioned. We have evidence of that as far as we can go back in history. We adapt ourselves to different circumstances, and there has been no study in the world's history that promises more at the present day than that of personal and corporate hygiene. If we can better our environment, we better the conditions of life, and thereby lengthen life. Physiological chemistry is taking the lead to-day, and the man who can take up that study and follow it out will give us the most light in the future. There has never been a time in the world's history when we have had so much promise of benefit to mankind as at present, and it is largely due to our increasing knowledge of what true hygienic conditions are.

Dr. Atkinson—We have seen a very beautiful representation of the development of tissues, and have been told that there must be a cell for these changes to take place. Now there is a correlative

of that, that if the cell grows from its nucleus it must naturally have increment of substance to increase the size of that nucleus, and to make the division that has been portrayed as actually occurring in the rabbit's egg, and in the unimpregnated chicken's egg. How came about the possibility of providing and elaborating the new impulse to that egg, that had to be fed to a certain point of ripeness to make it possible to establish a line of sympathy between the individuals, so that when thrown together in an undifferentiated mass, they become organized into semens, the combination of which produces the veritable germ.

We must understand that fine feeding, or else we are simply beating the air and talking about beautiful things without really following the line of evolution of the radiancy that is stored in these little bodies that constitute the papulum, the differentiations of which give us the classification of creatures. Hæckel said that the protista was a kingdom between the vegetable and the animal kingdoms.

We must be in our intellects and affections on a plane of fraternity and love of the truth, and until we do we will not make the progress that we should, even after we have had such a display as we have had to-night.

They tell us of chaos. We can never travel towards the real foundation until we comprehend chaos. Chaos is the conglomerated mass of planetary substance that is capable of being developed into planets and planetarian inhabitants, the discriminations and divisions of which constitute the classifications in natural history. We want to give a specific alphabetical statement to students who attempt to investigate these things. First chaos, next protoplasm, next protista, then the mineral kingdom, the typical form of which is the crystal, next the vegetable kingdom, characterized by the cell, as the doctor called it. The function of the cell is to vegetate. Then we come to the animal kingdom. What is the principal example of that? It is the corpuscle. It is not a cell. It is a cell and something more; just as the first protista was chaos and something more; the stored radiancy embodied in the planetary substance out of which all the body of the planet and its inhabitants take their origin.

Dr. Sudduth—You said the corpusele was more than the cell. I want to get your idea of what you term a cell.

Dr. Atkinson—The cell is the primal element of vegetable activity. It is simply a lump of jelly that is non-nucleated. I have written upon this subject, and I am pained to say that not a single

man has manifested the disposition to read understandingly what I have said. Some learned men have said I spoke ambiguously.

Dr. Thayer—What is a corpuscle?

Dr. Atkinson-A corpuscle is a little body.

Dr. Thayer—How does it differ from the cell?

Dr. Atkinson—It differs in its promise as a body.

Dr. Ottolengui—The paper teaches us that these cells are individuals. Dr. Heitzmann teaches that they are nothing of the kind.

Dr. Atkinson-It takes two lies to make a truth apparent They are both, and they are neither. That was undoubtedly at one time a globular body (referring to the screen). That is developed here first. It is globular: then they run together and become columnar: then they press against each other on all sides and flatten and become cuboidal. Then all outside of that (referring to the screen) is squamus or pavement epithelium. As they approach the surface, the flattening represented here becomes more marked, and they are ultimately shed as dry scales with a central nucleus. That may be round, cylindrical, cuboidal, or squamus, according to its age and mission it is fulfilling. They have muddled the truth about that, but I do not think he (Sudduth) did. Take that and transplant it anywhere where the epithelial body or malpegian layer has been taken off, and you have enough left of the capillary layer and the true skin, cutis vera, and it is capable of feeding and will make a beautiful epithelium and a new surface to the skin. The dandruff that we see on persons who are poorly groomed is shed epitheliel scales. We should understand how the feeding process goes on, and how in the process of digestion something is laid by for future use, as we bank some of our money; and if we would observe the process of respiration we would have a key to unlock this mystery. We get an oxide when not breathing. When we inspire and bring the atmosphere into the air vesicles a transition takes place. And what does that do? Just 4 per cent. of the oxygen that has been grasped by the lungs is appropriated, 96 per cent, is killed, is not fit to be used until it has passed the vegetable kingdom to be rejuvenated by discharging its carbon and taking in oxygen. The next step is to get rid of the breath which is expired. If we were learners and would learn the lesson that this example teaches us, it would give us a key to unlock every one of the modes of nutrient motion from the crystal to the cell and the corpuscle, the tissue, organ, system and consciousness. But I have expressed the entire roll from A to izzard.

Dr. Ottolengui-I do not understand your answer.

Dr. Atkinson—What is our body? Nothing but a single substance, an amœba, a mere big lump of jelly that differentiates into various tissues and organs. It is proved by many examples in the practice of medicine, in physiology, and the researches of the micologist and naturalist. The alimentary, respiratory, and urinary tracts are plainly laid out in the human amœba as foresteps to the perfect organs of the body; they are made up of indifferent corpuscles that are nothing but lumps of jelly. Then heredity is involved, and under favorable circumstances there is produced a similar ova to that from which we are told that body was developed. But where did the first one come from if this is true?

Dr. Sudduth-It was created by the power behind us.

Dr. Atkinson—He uses the word creation. The idea is right. "In the beginning God made man in his own image; in the image of God made he him; male and female created he them." There is first a single cell, holding the potentiality of father and mother. First is the maternal or love side; then the father, or wisdom; and then in the ongoing of these two, love and wisdom, the divine logos gives form and conformation to all planets and planetary inhabitants.

The potentiality that resides in the human amoba, that is the ovum already vivified, lays the foundation of the three embryonal sheets, so-called, the epiblast, hypoblast and mesoblest, the enfoldings of which give us the entire system of primal parts. Every time that you have a reproduction of tissue it has to go through that same process that I speak of. First, indiscriminate chaos: then completely digested food or peptones; then protoplasmic mass; then the embryonal corpuscle, out of which all the tissues arise, as exemplified in all reproduction of structure where there is fracture of the tissues; if they are favorably situated, they repeat the embryonal condition and series of changes, so that they are undistinguishable from the original material, and are not distinguishable as scar tissue; but where the circumstances are minus in organizing power, the white connective tissue corpuscles prevail to such an extent as to make the dense scar tissue that is known to prevail so extensively in burns and other mutilations, and which is less endowed with organizing power, and most liable to retrograde when under debilitating conditions of constitutional origin.

Dr. Sudduth—What are corpuseles, and what differentiates them? Are we able to see a corpusele?

Dr. Atkinson—Yes. These (referring to screen) are corpuscles, and may be the beginning of what you call cell division in proliferation of the new structure. You said they were nucleated cells. These little spots are neuclei. They are being merged into one another; so when we lift the connective tissue or epithelium from the papillæ of the true skin, we may have normal reproduction of the structure, or that which is less endowed and called scar tissue, or simply white connective tissue corpuscles binding the fractured parts together. These are all limitary tissues. When they are destroyed you get union between the horny layer, which is the true protection against infection.

They do not know what Heitzmann meant by saying that all protoplasm is organized. He has shown that in the red and white human corpuscle, in which the reticulum of what he calls living matter embraces the fluid or non-living portion of the corpuscle. Our American investigators have looked and looked and still they look to the east, to Europe, for the interpretation of these fine questions, but you have followed the line of investigation and treatment of the disease of Frederick III under Mackenzie, and the German physicians have seen that no single one of them made any specific reply to the question of whether the formation was or was not malignant: but they hedged and quarreled among themselves. and Mackenzie stands the only clean-cut man in the lot. He said in the start that he did not know whether it was malignant or not. They cut some tissue and sent it to Virchow, and he said he could not find anything in it that would warrant him in saying it was malignant. After the patient died then they decided that it was malignant cancer. They give us the old saw respecting carcinoma; if the patient dies, then it was cancer; if he don't die then it was not cancer. So you never cure cancer. There is no microscopical demonstration that shall teach us whether a tumor is malignant or not. It is not possible at this day to determine whether a tissue is malignant or non-malignant by microscopic means; and I do not hope to see it until we get deeper into physiological chemistry and understand what is the constitution of a chemical individual, what is aptomaine, a poison, or a leucomaine, and know more of the finer foods, to the tissues than is known to physiologists.

Dr. James Truman—Dr. Sudduth stated that there is no new life, that all cells come from cells, and all life comes from life, and he spoke several times of creation as though at some period there was no cell; that it was created. Now if all cells came from cells, and all life comes from preceding life, then there must be an eter-

nity of life, a continuous circle, and there is no necessity of creation at all. I don't understand his idea of creation under those circumstances. It seems to me unscientific,—unless there has been a beginning there never can be an end.

Dr. Sudduth—This question is a very hard one to answer. It is a question that is outside of demonstration. I have tried to-night to confine myself to that which can be demonstrated. The beginning of life can only be reasoned out. We know that we have passed through a stage of evolution. Spontaneous generation was called out and followed up, but did not go far until it was proven to be a chimera. We find that life is persistent throughout the atmosphere. There may have been a point, as evolutionists claim, in the existence of the earth when the circumstances were just right, and when spontaneous generation of life was possible; but all our analogies teach us the opposite. So we come back to that creative fiat that I acknowledge, and while the eye cannot penetrate the vale it recognizes a creator behind. This life is not eternal. Dr. Atkinson has misunderstood me. I have argued that behind all this there is something that we cannot fathom, which directs and guides this form of life. I think physical life is limited.

Dr. Ottolengui—I understand that Dr. Sudduth claims that these cells are individuals which can reproduce themselves, just the same as a plant which throws off a seed from which comes another plant entirely separate and distinct, except in the matter of heredity. Dr. Heitzmann teaches the opposite. He says that those cells, instead of dividing into two separate parts, simply grow out until the middle of each collapses, and by the time it has collapsed the two bulging sides are as large as the original cell was, and that process goes on and on, yet they are the same original cells. I want to know exactly what evidence he has that Dr. Heitzmann is wrong and that he is right in the matter.

Dr. Sudduth—We have here a display of the Malpegian layer of the skin, that makes the lining membrane of the mouth. Here is represented the epiblast, the outer of the three layers, and this represents the mesoblast, or middle layer. This Malpegian layer is made up of small granular bodies, which are called nuclei. They are the infant cells. Within each are seen numerous dark granular particles, which we call nucleoli. All cellular change begins within the nucleus by a re arrangement of the nucleoli, by a process termed karyokinsis. The nucleus then divides; after which the cell body divides. The subject was passed.

[TO BE CONTINUED.]

Editorial.

VOLUME X.

The present time seems to mark an era in the history of the onward movement of Dentistry. The spirit of organization seems to have taken hold of the entire body. In our estimation, no one step has been of more importance than the organization of the International Dental Publication Company. The times seem to have been ripe for such a movement and even its most sanguine promulgators have been almost startled at its success from its very incipiency. The profession is to be congratulated that, at last, a strong healthy organ, sustained by over one hundred of the best men in its ranks, has been established. Having no interests but that of the profession at large, its criticisms shall be outspoken and its judgment impartial. If an abuse needs correcting its columns shall always be open for as full ventilation as the occasion demands. Such has been the tone of the journal for years, and a glance at its advertising columns is all that is needed to convince any person that its independence is fully appreciated, and that the manufacturing interests have full confidence in the ultimate success of the Journal, and are willing to help establish it. Had we had the time, there is no doubt that we could have materially increased our advertising. What we have has come to us voluntarily, or through correspondence. No more substantial proof could be adduced that there was a need for just such a movement.

We also feel proud of our subscription list which is rapidly increasing; our readers numbering at the present time nearly two thousand five hundred of the most progressive men in the profession. Our foreign circulation equals or exceeds that of any other American journal published. Our list of foreign correspondents, although not as yet complete, numbers some of the very brightest men abroad.

It has been said that the movement was evanescent, and would soon die out. That is farthest from the truth. It is gaining strength every day. Its influence is far-reaching, and will in time penetrate every portion of the country where English is spoken and dentistry practised.

It has also been queried as to what was independent journalism; and, in reply we will say, journalism that will stand for the good of the entire profession in everything that pertains to the general good regardless of self-interest. A journalism that will grasp at any progressive movement, and fully

and heartily second it without first having to "consult its attorney." A journalism that is in harmony with the profession at large and needs no apology for its position. A journalism that knows no interest except that of the dental profession for which it is published, because it is owned and controlled by members of that body. A journalism in which journalism is first, and trade a secondary matter. A journalism that tries to inculcate a professional spirit, and stir up a personal pride in all that relates to dentistry, and, lastly, a journalism that will in time receive the full support of every man who loves his profession and desires to see its advancement.

In order that the entire body of practising dentists may have an opportunity of knowing of the aims and purposes of the International Dental Journal, we appeal to each and every subscriber to present its claims to the brother practitioners with whom he comes in contact. We appeal to you for financial support for the only journal that can make any just claim to being the organ of the profession.

THE DENTAL PROTECTIVE ASSOCIATION.

No step that our specialty has made since it merged from the position of a trade seems to us to have so important a bearing upon the future status of Dentistry as have the efforts at organization and self-assertion made during the past year. The organization and incorporation of the Dental Protective Association in Chicago is a movement in the right direction. We see vast possibilities for good in such an organization.

It is not the aim of the Dental Protective Association to organize to defeat legitimate and honorable business; but, on the other hand, to encourage and stimulate fair and open competition in the manufacture of all the necessaries that are used in the practice of dentistry. Judiciously handled, the money that it is proposed to collect can be used in many ways to fulfill these ends.

It is not our purpose in this article to specify any particular line in which abuses have been practised in the past. All are too well acquainted with cases where the name extortion could be applied to need mention from us. Neither do we mean to make open war against legitimate business enterprise; but only in those cases where marked injustice and oppression have not only been practised, but with a "What are you going to do about it" air that is particularly galling. Chains are not so hard to bear when their links are smoothed; and they are even used as ornaments and worn with

pleasure at times. It, however, makes a very considerable difference as to who by, and the manner in which, the key is turned that binds for the time being our hands.

We do not desire to be understood as impugning the motives or business integrity of the parties who hold the control of certain necessities. They have become possessed of these patents, so far as we know, by fair and legitimate means. But what we do mean to say is, that they should never have been allowed to come into the possession of such claims, or, having obtained them, should be made to so use them as not to abuse their privileges.

We have no doubt that if the claims of quite a number of the existing patents on dental goods were to be contested at the present time, with the evident tendency of the courts to decide in favor of the people, very many of them would be declared invalid. But that is not the aim for which the Dental Protective Association was founded. Its sole purpose, as set forth in their appeal, which may be found in our advertising columns, is to prevent abuses, and the good sense of the profession will never allow the funds in its hands to be used to interfere with legitimate business enterprises. Among the many ways in which such a fund might be used is the purchasing of patents on desirable and useful inventions, and giving them to the profession, instead of allowing them to pass into the hands of large corporations and be shelved. The smaller houses would then be stimulated, and open competition would be encouraged. No fact, at the present time, is more patent than that the dental manufacturer and dealer is sadly in need of the right to manufacture a few of the leading staple articles that are in daily use in the office. This is not because such articles are not being invented, but because that as fast as they are brought out they are gobbled up and put to one side. Smaller houses are afraid to purchase them because of the certainty of purchasing a law suit.

It is a well known fact that no patent is considered of any value until it has been successfully defended in the courts. We are in favor of legitimate business all the way through; and once have fair competition established, and the price of dental goods will go in the same lines as that of other manufactured products.

But how is the Dental Protective Association going to bring this about? In many ways. In the first place, with a large fund at its command it can fight abuses which deserve to be overthrown; then again, it can purchase from first hands desirable patents and give them to the trade. They can then be manufactured by anyone who desires to enter into the business, and compete openly with other manufacturers; and, further, it can purchase existing patents from those manufacturers already holding them, at fair prices, and thus relieve the profession of the existing royalty which, if paid individually, amounts to an imposition in many instances. The refusal of any manufacturer or corporation to sell at an appraised valuation, would be evidence upon the face of it, that the special line of goods so manufactured was not sold at a fair legitimate profit. There should not be any antagonism between manufacturers and the profession. If the latter organizes and talks business it should not be decried. It surely has some rights besides paying out all its hard earnings to the manufacturer.

We have specified no names, and have only spoken in a general way. The time is not ripe for entering into the minutiæ of the question. The thing for the profession to do is to organize and get together a fund that will ensure respect and fear.

The character of the officers of the Dental Protective Association is above reproach. They are known to be men who have the courage of their convictions, and who have the interests of the dental profession at heart. They are not inexperienced, and have gone into this movement with the full recognition of the immense amount of labor attached to it. The fact that the funds are to be in the hands of such a prominent and well known man as Lyman J. Gage will give confidence in the movement, and we predict a hearty reception of it at the hands of the profession.

A CHANGE OF PUBLISHERS.

With the beginning of the third volume the *Dental Review* will change publishers. Keener has no doubt found that dental journals are not a very profitable investment. H. D. Justi now assumes the responsibility of the publication, whether as an interested party, other than simply as publisher, deponent saith not. We did not, however, know that the well-known manufacturer of dental supplies had a publishing department in connection with his business before. The editor disclaims any sale or change of policy in the journal, and says that the *Review* will go on in the old, old way, as if no change had taken place.

OUR TOPICAL INDEX.

We take considerable pride in calling attention to the exhaustive cross index for 1888 found in this number. It is run as a single form and placed at the end of the reading pages, which are also full forms. It can, therefore, be taken out by cutting the wire binding-thread, and bound with volume IX. There has been considerable call for such an index, but the immense amount of labor and time necessary to compile it have no doubt kept other journals from adopting it. The International does not intend to spare labor or money to give its readers the best journal published in this country. Send us in your subscription for 1889, and see if we do not keep our word. It will only cost you two dollars to find out. We do not mean by that, that we are going to reduce the price of the journal for the entire year; oh, no; but we will send a full receipt for 1889 to all who send in the above amount within the next thirty days. Please tell some of your brother practitioners. Don't put it off, or it will be too late for them to avail themselves of the reduction; also, don't forget that you can renew on the same terms.

CHANGE OF TIME OF ISSUE.

It has been decided to change the date of issuing the journal to the fifteenth of the month. In the future the journal will be mailed regularly on the fourteenth day of the month, except when such date comes on the Sabbath, when it will be mailed on the preceding Saturday. We have been led to this change because of the fact that nearly all the dental journals published are issued upon the first of the month. We will be able to get news of interest which others that have gone to press earlier will not have; and, while on the other hand, they will have news that we will not get, yet such is our aim, and our desire is to publish news that cannot be found in other journals, and news also of such a character as will make the journal a necessity in the office of every progressive dentist. Send us in your subscription for 1889. We do not want to drop you from our list. The journal will come to you on the middle of the month, when you have gotten tired looking at the advertisements in the other journals, and will be a change that we know you will appreciate.

A CORRECTION.

Dr. M. L. Rhine desires us to say that in reporting his remarks on Dr. Allan's paper at the Boston meeting, we make him say "vascular" fibrils when "living" fibrils was intended. The error occurs on page 584 of the November number in the sentence, "The illustrations presented last evening distinctly showed that 'vascular' fibrils penetrated the enamel."

Domestic Correspondence.

To THE EDITOR:

The dentists of New York probably enjoy a more perfect organization than those of any other State. There are eight district societies, holding regular annual and semi-annual meetings, and delegates from these, with its own permanent members, make up the State Society, which meets annually. All dues to the latter are paid by the District Societies, and thus is secured an organization which does not depend upon the chances of voluntary attendance. The government of dentists in their professional relations is entrusted to the State Society, which acts through its delegated representatives. All these societies are organized under due process of law, and at each annual meeting there are certain legal requirements to meet, which obliges them to hold the annual meeting at definite times and places within the bounds of each district.

But the semi-annual meetings are held solely for scientific purposes, and it has been the case that frequently two or more District Societies hold their meetings together. Such a one was the late Syracuse reunion, perhaps the most noteworthy and successful of any since their organization more than twenty years ago. It was eminently fit and proper that such a meeting should be held at Syracuse, for Onondaga County, within whose limits the city is situated, has been the mother of many whose names are held in high honor by dentists. Chapin A. Harris, the father of modern dentistry, was born in this county, and it was also the home of the lamented Amos Westcott. Wm. H. Dwinelle here commenced his honorable professional career, and his warm heart has ever cherished in its warmest corner a love for the home of his early days. Frank Abbott and Albert H. Brockway long ago left Onondaga for a richer field of usefulness in New York, while John S. Marshall strayed to Chicago, and there are others who claim Onondaga as the initial point in their useful lives. All of these who are vet living, if we except Dr. Abbott, were present at the meeting, and their number was swelled by such men as E. T. Darby of Philadelphia, T. W. Brophy of Chicago, J. B. Willmott of Toronto, W. Geo. Beers of Montreal, and W. C. Barrett, of Buffalo. I shall not attempt a report of the meeting; but it may be comprehended that the occasion was one of great interest and profit. Some of the papers read possessed great merit, and it is a source of gratification to know that the best of these were written by practicing dentists. Several addresses were made by invited medical men, but the same interest did not centre in them.

There was a very unusual display of dental goods, the S. S. White Company exhibiting a complete electrical plant. The clinics were especially instructive, a large number of surgical cases being presented. A grand banquet was given by the Fifth District Society, whose guests the other societies were, at which about three hundred were present, and speeches, sentiments and music entertained all until a late hour, while on the same evening the ladies who accompanied the members and visitors were tendered a reception at the hospitable home of Dr. Charles Barnes. Great credit is due the Syracuse dentists who labored so unceasingly to make of the meeting the great success which it proved.

The next semi-annual meeting of the four Societies will be with the Sixth District, at Elmira, a year hence, and as the members of that Society have already commenced the work of preparation, a memorable time is certain.

TO THE EDITOR:

The annual meeting of the American Academy of Dental Science was held in Boston on Wednesday, Nov. 14. A number of members of the New York Odontological Society were present, in response to special invitations sent to that body. Gentlemen were also present from Providence, Newport, Salem and other places. In the morning the members of the Academy and their guests visited Cambridge in carriages provided by the former. The day was beautiful, and the ride a delightful one. On reaching Harvard College grounds, the entire party visited several of the College buildings; but the chief point of interest was the Peabody Museum, where Prof. Putnam, who has charge of the department, received the visitors with a warm welcome, and conducted them from room to room, showing and explaining the various specimens as well as possible in the limited time given him. The numerous specimens of crania particularly interested the visitors, who were delighted with what they saw, and also with the genial professor for his kindness and for the cordial reception he gave them.

On their return to Boston, the guests were conveyed to the Algonquin Club-house, a new and magnificent structure with exquisite appointments, which called forth many expressions of admiration. In one of the elegant dining-rooms a bounteous repast was

prepared for the party, who, when seated around the long table, did ample justice to the festive occasion.

At 4 p.m., the members of the Academy and their friends assembled at Young's Hotel, where a parlor had been engaged for the annual meeting. Dr. C. P. Wilson, President of the Academy, called the meeting to order, and an hour or more was spent in listening to the reading of annual reports of officers, committees, etc.; after which was an election of officers for the ensuing year. All the officers of the term just expired were re-elected; which seemed good evidence that they were just the right men for their places.

The regular business of the meeting being over, the President introduced Dr. C. E. Francis, of New York, as orator of the occasion.

Dr. F. announced as his subject, "The Achievements and Hopes of our Specialty," in which he referred to early periods of medical practice, the progress of medical science, and the creation of special departments in medicine. He paid a just tribute to the pioneers and teachers of dental art and science, who had done so much to ennoble their calling. He spoke of the grand work done by dentists, and of the many achievements they had accomplished. He complimented the dental colleges, and instructors who had devoted their time and talent in the cause of professional advancement. He looked upon dental societies as the life and strength of our specialty, and referred to the great work they had done.

Dr. Francis dwelt at some length on the relation of dentistry to medicine; considering it a legitimate branch of the mother profession, and fully recognized as such by the American Medical Association and the International Medical Congress. The doctor closed his address by exhorting his hearers to spare no endeavor to honor their chosen specialty; to discharge each and every duty forced upon them with an intelligent will, and thereby sustain the position claimed and conceded as specialists of the great "healing art."

At the close of the address, a vote of thanks was tendered to Dr. Francis, and the meeting adjourned to partake of a banquet in one of the large dining-rooms of the hotel.

The table and appointments were exceedingly fine, and nearly fifty happy gentlemen were comfortably seated. Our Boston friends gave decided evidence of their ability to entertain their guests in a most charming and enjoyable manner. Such a profusion of good things provided for the inner man; such expressions of good and satisfactory feeling all around; such capital after-dinner speeches;

and such a flow of complimentary utterances would be difficult to surpass or equal. Rev. Phillips Brooks, the great Boston preacher, who was present, partook of the happy spirit of the occasion, and made one of his characteristic and delightful speeches. After nearly five hours had been spent in this genial way, the party adjourned, with kind adieus and mutual good wishes.

TO THE EDITOR:

Will you kindly give place in the I. D. J. to the enclosed correspondence, and oblige, F. A. Levy.

F. J. S. Gorgas, M.D., D.D.S., ORANGE, December 1, 1888.

Dean Dental Department University of Maryland.

Dear Sir: My attention has just been called to the correspondence published by you in the October number of the American Journal of Dental Science, much of it dated in November; from which it appears that you have suppressed my answer to yours of November 1, wherein I gave you the full particulars, as requested, of the dropping of the name of the University of Maryland Dental Department from the list of colleges whose diplomas should be recommended to the State Examining Boards, to be received in lieu of an examination.

I further notice, upon page 285 of the same issue of the American Journal of Dental Science, in a letter to Dr. T. S. Waters, you say: "I wrote to Dr. Frederick A. Levy, of Orange, N. J., asking him 'if our dental department had been omitted from the list of dental schools by your association, and, if so, for what cause,' etc., etc. He returned no answer to my questions."

By the publication of that letter at this time, and after you had received my answer, before referred to, you could have had no other intention than to place me in an unenviable position, and to mislead the public. It is a very weak cause which descends to these peculiar methods of bolstering itself up.

Kindly let me hear from you, by return mail, whether I can look to you to correct the above errors, and also to publish my answer of November 5th, in the same publications in which appeared the balance of this correspondence?

Very truly yours, Frederick A. Levy, Secretary.

[Not hearing from Dr. Gorgas, Dr. Levy wrote the publishers of the American Journal of Dental Science, Messrs. Snowden & Cowan; and not hearing from them either, Dr. Levy, in justice to himself, therefore writes us, requesting that we publish the entire correspondence between himself and Dr. Gorgas, which we will gladly do in our next issue.—ED.]

Foreign Correspondence.

DR. W. XAVIER SUDDUTH,

Editor International Dental Journal:

Dear Sir:—I am duly in receipt of your recent favor, and have given the contents careful consideration.

I quite believe there is room for an international journal of dental and oral surgery on the lines you indicate, and that edited by the gentlemen whose names you mention should be a success. I will be most happy to accept the appointment you so flatteringly offer me, and do what I can to further the interests of the new journal.

There are a few good men in Scotland whose contributions would do credit to any publication, and some of them I think I could move to active assistance.

But as regards this and other details, such as date of publication, price, etc., you will furnish me, with particulars, when the scheme is nearer maturity.

Knowing that you must at present have much correspondence to read and answer, I will not further trespass, but thank you and those associated with you for the confidence reposed in me.

I am, dear sir, yours truly,

W. BOWMAN MACLEOD,

16 George Square, Edinburgh, Scotland. To the Editor:

Dr. Miller, with whom I am in correspondence with regard to dental matters, has kindly extended to me an invitation to act as

a foreign correspondent to the "new journal."

The writing of elaborate papers is entirely out of my line, but I shall hope now and then to contribute little hints which seem to me to be of practical value; of which the following is one: In fitting erowns it is sometimes a difficult thing to decide just where to grind in order to form a perfect joint. The writer has found that by mixing, while melted, one part lampblack, by bulk, to five parts yellow or white wax, that an excellent material is formed for determining the point of contact.

The mass is perfectly opaque and shows accurately the point of articulation. The wax may be rolled into sticks when slightly cooled, or it may be poured, while melted, into glass tubes and allowed to cool. These tubes may afterwards be dipped into warm water and the "wax sticks" pushed out with the handle of an excavator. It is used in a manner similar to ordinary wax.

The crown and root are ground so as to fit approximately, then a small portion of the warmed wax is placed around the pin and the crown inserted. The points which come in contact will show accur-

ately through the black wax and indicate where the grinding is to be done. The amount to be removed may be estimated by "sounding" the wax at the sides with a fine pointed instrument. The thickness of the wax will indicate just how much must be ground away to form a perfect joint. I know that the use of wax in this way is not new, but I have found the black wax so much better than the ordinary wax that I consider it of sufficient importance to tell of it.

I shall look with much interest on the first number of the new volume, and will take pleasure in adding my mite to help keep it up

to its present high state of excellence. L. C. BRYAN,

Basle, Switzerland.

Current News.

Who will play the Review organ?

Dr. Alton Thompson has resigned the editorial chair. We are sorry to lose Dr. T. from our ranks.

Dr. A. Morseman has accepted the position of associate editor made vacant by the resignation of Dr. Thompson. We congratulate the Western Dental Journal on its acquisition.

H. D. Justi has undertaken the publication of the *Dental Review*. The editors claim that the journal has not departed from its position as an independent journal, but the publishers say that "they have an organ now."

Dr. J. D. Patterson, the genial editor of the Western Dental Journal, made a hurried call upon us in our sanctum the past week. He was anxiously enquiring for the last issue of his journal. We appreciate your feelings, Doctor. We have been away from home too, and wondered whether things would go all right in our absence

THE TWENTY-FIFTH ANNIVERSARY OF THE CHICAGO DENTAL SOCIETY

Will be celebrated by a Three Days' Meeting to be held in the Ladies' Ordinary, of the Grand Pacific Hotel, corner of Clark and Jackson Streets, Chicago, Ill., February 5, 6, and 7, 1889.

The Grand Pacific Hotel will be the headquarters for guests, and will furnish rooms above the parlor floor, with board, at three dollars per day. All other rooms at fifty cents per day less than usual rates.

The committee expect to secure reduced rates, therefore the usual receipts should be taken when railroad tickets are purchased showing the payment of full fare, so as to secure reduced rates returning where it is possible.

An exhibit will be made by manufacturers and dealers of novelties in their various lines.

The meetings will be exclusively devoted to the reading of papers and the discussion of professional subjects, and no other business will be transacted.

PROGRAMME. TUESDAY MORNING, FEB. 5, 1889.

The meeting will be called to order promptly at 10 o'clock.

PRAYER

By Rev. G. C. Lorimer, D.D., of Chicago.

PAPER—"Gum-colored Porcelain Fillings," by A. H. Thompson, Topeka, Kansas.

DISCUSSION.

PAPER—"A Study of the Effects of Cocaine upon Man and Some of the Lower Animals," by C. P. Pruyn, Chicago, Illinois.

Paper—"Obtundents of Sensitive Dentine," by T. E. Weeks, Minneapolis, Minn.

TUESDAY EVENING, 7.30 O'CLOCK.

Paper—"The Study of Pre-historic Remains in their Relation to Dentistry," by J. J. R. Patrick, Belleville, Illinois.

DISCUSSION.

Paper—" Caries and Necrosis in the Relation to Practical Dentistry," by J. H. Martindale, Minneapolis, Minn.

WEDNESDAY MORNING, 9 O'CLOCK.

CLINICS at the Chicago College of Dental Surgery.

WEDNESDAY AFTERNOON, 3 O'CLOCK.

Paper—" Antiseptics," by G. V. Black, Chicago, Illinois. Wednesday evening, 7.30 o'clock.

PAPER, with Lantern Illustrations—"The Development of the Teeth, the Formation of Dentine, and its Appearance in Health and Decay." The paper will be illustrated by photo-micrographs, projected on the screen by means of the oxy-hydrogen lantern. Many of the photographs were made for this demonstration; others are from Dr. W. D. Miller's beautiful specimens of Natural and Artificial Decay. By R. R. Andrews, Cambridge, Mass.

DISCUSSION.

Paper—" Artistic Methods in Prosthetic Dentistry," by L. W. Comstock, Indianapolis, Ind. Illustrated by large cartoons.

CLINICS will be held on Wednesday and Thursday mornings at the Chicago College of Dental Surgery, northeast corner Wabash Avenue and Madison Street. They will begin promptly at 9 o'clock.

WEDNESDAY, FEB. 6.

J. B. Vernon, St. Louis, Mo.; Bridge Work.

C. Thomas, Des Moines, Iowa; Porcelain Fillings.

Francis Peabody, Louisville, Ky.; Filling Root Canals with

Lead Points.

C. S. Case, Jackson, Mich., will demonstrate his method of making artificial vela and obturators for cleft palate, provided a subject can be secured.

A. H. Thompson, Topeka, Kansas; Gum-colored Porcelain

Fillings.

E. T. Darby, Philadelphia, Pa.; Filling with Crystal Gold: and the use of Matrices.

A. W. Hoyt, Chicago, Ill.; Porcelain Fillings secured by Gold Filling.

S. G. Perry, New York City, will demonstrate the application of Perry's Separators, and the Weber-Perry Engine and Mallet.

T. E. Weeks, Minneapolis, Minn.; Setting of Logan Crown with Gold Attachment, showing original method of Investment for Soldering.

D. F. Mc Graw, Mankats, Minn.; Obtunding of Sensitive Dentine, and Controlling of Peri-Dental Inflammation by Electrolysis.

J. W. Wick, St. Louis, Mo.; His method of Gold Filling. Louis Ottofy, Chicago, Ill.; Implantation.

THURSDAY, FEB. 7.

T. D. Gilmer, Quincy, Ill.; Gold Crown Telescoped over a Platinum Band; also a Combination Crown of Platinum and Weston's Metal, or of Gold, Porcelain, and Weston's Metal.

E. H. Allen, Freeport, Ill.; Gold Filling, using Electric Mallet.

C. N. Johnson, Chicago, Ill.; Gold Filling. C. W. Lewis, Chicago, Ill.; Herbst Method. J. G. Reid, Chicago, Ill.; Copper Amalgam.

M. E. Smith, Chicago, Ill.; Gold Filling, using Snow & Lewis Plugger.

W. H. Taggart, Freeport, Ill., will show a new Root Trimmer,

and a new Suspension Engine.

J. W. Wassall, Chicago, Ill., will demonstrate Root Filling with Chlora-percha and Gold Points; also the use of McKellop's Platinum Gold Broaches.

E. A. Royce, Chicago, Ill.; Gold Filling, using Abbey's Non-

Cohesive Gold in Cylinders.

T. S. Waters, Baltimore, Md.; Movable Bridge.

R. B. Winder, Baltimore, Md.; Movable Bridge; also a new Rubber Dam Clamp, combined with a Cheek Holder; also a separator.

Henry A. Parr, New York City; Movable Bridge.

J. A. Woodward, Philadelphia, Pa.; Reflector for lighting the mouth.

J. N. Farrar, New York City, is expected to be here, and will exhibit his Regulating Appliances.

> J. N. CROUSE, GEO. H. CUSHING, E. Noyes, Executive Committee.

THE

International Dental Journal.

Vol. X.

FEBRUARY, 1889.

No. 2.

Original Communications.

THE TREATMENT OF PROXIMATE SURFACES.2

BY SAFFORD G. PERRY, D.D.S., NEW YORK.

In response to your committee's request for a paper on the treatment of proximate surfaces, I replied that I could not hope to add anything to what is already known on that subject; that it is too late in our profession to make it interesting, and, at best, all I could write would be only a repetition of what I had already written. Your committee replied that in a profession that so taxed the time and energies of its members even those most alert would not, without this repetition, master all the details of so important a subject, and that for those who were not so alert there could be no hope of securing a complete comprehension of the subject except by just such repetitions. Your committee further stated that although so much had been done during the last decade to put the care of these surfaces on a scientific basis, yet the fact remains that throughout the world to-day, as shown by practical results in the mouths of patients, it is the exception and not the rule that the laws that govern these operations are understood and complied with.

It was further suggested that if not undertaken in the interest of those already in the profession, it was still a duty to emphasize

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read at the Tenth Anniversary Meeting of the Odontological Society of Pennsylvania, Dec. 13, 1888.

the importance of the subject for the benefit of those about to enter it.

Not being able to deny the force of your committee's reasoning, and not wanting to refuse to respond in some slight way in return for the generous support, your city has always given when New York has asked for contributions to her meetings, I finally consented to write a paper, but with the distinct understanding that I was to be indulged in repeating much that I had written before on the same subject.

At the very outset it seems a useless task, for it is not possible to add much that is new after the very careful and comprehensive treatment of the subject by Dr. Jack, in the American system of dentistry, to say nothing of several notable contributions to the literature of the subject during the last few years from the pens of such men as Drs. Bogue, Davenport, and Howe. And yet it is a subject so important that almost a book could be written on it without exhausting its interest to those who appreciate its significance.

Some years ago I made a careful estimate from one of my chart books, and found that more than half my time had been given to the care of the proximate surfaces. It is probable that my experience has been so nearly that of others that it is safe to say that in practice to-day the care of these surfaces requires more thought and effort than all other dental work combined. With reference to the treatment of buccal or grinding surfaces there can be little difference of opinion. Methods may differ, but results must be the same.

But when we come to consider the treatment of proximate surfaces, the simple conditions are replaced by complex ones that are so various, that one must have had many years' experience to be able to master them in all their details.

The first and most important question that is presented to the mind of every man who undertakes the care of a proximate surface is the question of contour. There can be no evasion of this question by one who desires to be equipped for the best work of the present day.

I will not pause here to go fully over the ground of the old discussion of so-called permanent separations versus restorations. I may as well state plainly at the outset that I am an uncompromising advocate of the restoration of the shapes of the teeth, as a general rule of practice. The reasons for this are so many that a long session would be required to relate them in detail; and, more-



over, they are so self-evident that it would seem to be a waste of time and an affront to your intelligence to go over them. And yet, as hinted by your committee, after all that has been so conclusively written against the pernicious habit of filing, and all that has been done in practical work by so many of our best operators in proof of the advantages of restorations, it still remains with many an open question, and to-day, throughout the world, if men's opinions are to be judged by their works, there are a very large number of operators,-many of whom we all know and respect, and some of whom we love,—who are still so evidently bound by habit to the unconscious dangers and temptations of the old practice of filing that it would almost seem as if we were yet in the babyhood of our profession, so that, after all, it seems as if I must pause a moment to touch upon some of the dangers of the one practice and the advantages of the other, even if I betray my "bias" to the point of weakening my argument in your minds. This "bias" is not of recent date. It is a slow growth, and as inevitable and unalterable as the conviction that two and two make four. In astronomy the "personal equation" has always to be taken into account. Through powerful glasses, that greatly magnify the slightest variation of vision, no two observers can be found who can see and describe the heavenly bodies exactly alike. And so in our field of effort it cannot be expected that all should see with the same eyes, and differences of opinion must be expected on most subjects; but on this, which it seems to me is capable of distinct definition, I fail to see how there can be, if we really understand each other, a very wide difference of opinion.

Our opinions are the result of accumulated experiences, and one who has had long experience may perhaps lay claim to the privilege of speaking with some degree of confidence on such a subject as this.

If I venture to sketch my experience in justification of my convictions on this subject, I trust it will be considered a legitimate means of argumentation, and not an egotistic desire to thrust myself into the subject. And it will be the only justification for the dogmatic tone this paper may assume.

In order to make the points I desire to make I must refer to and quote from a paper of mine on this subject, read in this city before the Odontographic Society of Pennsylvania, in 1870. In that paper I advocated the perfect restoration and, in some cases, the slight exaggeration of the shapes of the teeth. This will be shown by the following quotation:

"If we take nature as our guide, and desire to attain to her perfection, it is evident that, between molars and bicuspids at least, the file should only be used as it may facilitate the operation of restoring with gold the lost shape of the tooth. * * * If there must be a departure from the natural form of the teeth, I would prefer in such cases the other extreme—that of leaving the gold in proximate cavities slightly projecting, so that it, and not the tooth, shall rest against the adjoining tooth, or the filling in the adjoining tooth, as the case may be. * * * I do not wish to be understood as advocating the building out of rounded knobs of gold between the teeth, so that they shall be held apart; but I would ask your attention to the propriety of packing the gold a little beyond the original outline of the tooth and finishing up with thin, trowel-shape files and sickle-shaped scrapers, leaving the gold when finished quite as full as the tooth originally was, rather than pass between them a separating file, that would leave a flat, proximate surface. I should prefer a slightly unnatural fullness, rather than have a space, or an unnaturally flat surface."

The point I wish to make by this quotation, and which I cannot make in any other way, is that a very large proportion of the proximate fillings made on this general plan before this was written are standing to-day, after twenty years' use, in good condition.

This is stated in no boastful spirit, but with a desire to present the exact facts. A very large proportion of the fillings made several years later, when I had become a convert to Dr. Arthur's system, have since been removed, many of them at great cost of time and labor, owing to the difficulty of restoring the lost shapes of the teeth. If Dr. Arthur's book had never been published and I had not been influenced by his earnest personalty, but had held to my early plan of restorations, my patients would have been saved endless annoyance and I should have had no dark period in my professional life to look back upon. The publication of his book and the circumstance of making his personal acquaintance, followed by a long and interesting correspondence with him, led me step by step to look with favor on his system, until I came to the point of making all the spaces described by him. I became so demoralized as to willingly destroy the shapes of the teeth that I had before guarded with jealous care.

The result of that practice finally became a source of discouragement and mortification to me. Failures which formerly occurred only in reasonable numbers, under this system became surprisingly frequent. Irritation of the gums, and change of position of the teeth, which could not occur before, so frequently followed this practice that, after enduring it a few years, I was glad to return to the old one of the restoration of the shape of the teeth. I have continued this practice to the present day, and I expect to continue it to the end. As I look back over the past



twenty-five years I see so much to commend in it, and so little in the other, that there is left for me no other choice. Having been twice on one side of the question and once on the other, I feel entitled to speak with no little confidence.

In 1870 the restoration of the shapes of the teeth was not common practice. There was little to encourage one in that practice at that time. It was not unusual for the older operators, in examining a large contour filling, to probe along the cervical border, and with an ominous shake of the head predict that failure would follow there in a few years. But as a matter of fact failures have not followed in any considerable number of cases, even after all these years. These operators, taught by their experience to expect failures at all the sheltered points, expected it here. They failed to see that a new set of conditions had been established by which decay was almost certain not to occur. But they could not be made to believe this, and it could not be proven until after many years,—except to those who had the faith that is born of enthusiastic and irresistible conviction.

Fortunately, during that period when Dr. Arthur's earnest words-for he was as earnest as he was conscientious-had unsettled my convictions, there were still many patients whose teeth I never touched only to restore them, and to-day they are the patients most creditable to me. Many of them have large contour fillings that cost pain and effort; but, once being done so that the teeth were held in position and the gums protected, the years come and go and the patients forget that they have teeth at all. This is no fancy picture, but can be verified at any time. In my own teeth are large contour fillings, described in the article from which I have quoted, and put in by Dr. Varney over twenty years ago. They stand untouched from the day they were finished, and can be seen to-day by any one who cares to examine them. They have been a priceless benefit and comfort to me, and they stand an eloquent example of his matchless skill, and an unanswerable argument in favor of the restoration of the shapes of the teeth.

It is only after a long stretch of time that a just estimate can be made of the relative value of these opposing systems. It is easy to see that at first a clear gain seems to be made by making permanent separations. It takes years before the evil is noticed. It was partly this delusion that led me to adopt it; and it required several years before I saw that I was treading on dangerous ground. It was at first a great satisfaction to cut between molars or bicuspids where a cavity was suspected, and to find it and fill it easily

and quickly, and to flatter myself that the proximate surfaces were laid open so that they could be easily examined, and yet the gum but little, if any, disturbed. I could not then anticipate the slow change of position of the teeth; the disturbance of the festoons of the gums, owing to the loss of the bulge of the teeth that nature had designed to protect them; the recurrence of decay near the gum, causing the melting away of the shoulder that had helped to hold them in position; the slipping of food through, against and under the gum; and, finally, the need of large fillings, that must now be made under most unfavorable circumstances. With the teeth tipped the gums disturbed and sensitive, and the cavity extending on the root of the tooth, the task is much harder than if the cavity had, when of fair size, been filled by cutting down from the grinding surface and making a contour filling which should be so shaped that it would stand firmly against the neighboring tooth, and of such size that its borders would be free, except along the cervical edge, when the teeth had settled to their proper place. If the cavity had been neglected until it had become large, if filled on the same plan, it would be still safer; because then the cervical border of the filling would have to go under the gum, and if properly done, no further anxiety need be felt for it.

If the teeth chanced to be of good structure and the cavity small, how much better to spread them with a separator the thickness of a sheet of thin sand-paper, and cutting with small burs, or specially shaped, delicate excavators, from the grinding, lingual or buccal aspect, fill them with gold or copper amalgam, and allow them to go back to their natural positions, with their contour absolutely untouched.

Following this plan, it would not be probable that a patient would come in saying, as one did to me some years after the Arthur aberration: "This space between my teeth is giving me no end of trouble and annoyance, and I think there must be a cavity there. I have named it 'Perry's Chasm.'" Nor would there have been made to me the following remark: "Doctor, do you notice that on the left side, where many years ago separations were made between the back teeth, nearly all the cut surfaces have had to be filled; while on the other side, where no cutting was ever done, the teeth have never been filled and are still in good condition."

Only a few days ago a lady said to me: "Do you remember that many years ago you wanted to cut between some of my back teeth because you thought there were or would be cavities there, and mother begged you not to do it, and it was not done; and do you see that all of those teeth are still sound? Mother knew; did she not?"

I tell you, gentlemen, mothers do know; the public knows, and you may reason with all the plausibility at your command and you cannot overcome the widespread, instinctive dislike of that practice. You may flatter yourself that you have made a good argument, and as the patient does not get up and leave at once, you go on with your cutting and filing. But a year goes by and your patient does not re-appear; he has quietly slipped away to some one of those men who try to leave the teeth as nature made them.

The public calls this filing "taking off the enamel." It is more than that. It is taking off from the operator the armor of courage and confidence in his own ability to make his work a real blessing to his patient, and leaves him bare and unprotected against the temptation of doing hasty, botchy and inartistic work. The evil effects of this practice are not felt by the patient only, but indirectly by the operator, who becomes demoralized and ready to cut and hack with the reverence of a bull in a china closet, unmindful of the fact that nature, in her constructive processes, has produced in the teeth of man a marvelous example of the adaptation of means to ends-of means by which a given amount of tooth material is distributed so as to secure a combination of the greatest amount of strength with the greatest amount of beauty of form and outline. The marvelously beautiful curves and outlines that are shown by the teeth could have held the attention and fired the imagination of even Michael Angelo, who would have found in them examples of arches and abutments for his studies in architecture, and of models of grace and beauty of outline for his works of sculpture.

The cusps of the teeth suggest Gothic domes, and half of a cross section of a bicuspid is a perfect model of a Roman arch. If the enamel could be taken off the dentine, as you would take a thimble off your finger, and could be viewed from the under side, it would present a series of arches and domes that might well serve as models in construction for the great temples of the world.

If the arches of a temple are made with bricks and stones that are laid so as to support the weight of the whole structure, it does not require a very lively imagination to see that the enamel prisms are also laid so that they may best support the weight of mastication. How long could it be expected that St. Peter's at Rome would stand, if on opposite sides a huge Arthur disk should

cut away the side walls and parts of the dome? It would have been before this a crumbling ruin, as countless numbers of teeth are that have been so treated.

I venture the prediction that if Michael Angelo had been a dentist instead of one of the greatest artists and the greatest architect the world has ever known, he would never have sinned against himself by mutilating a tooth. Inevitably he would have been a contourist, for his great soul would never have been content except in the study and the reproduction of the perfect models that only nature—the source of all artistic inspiration—sets. You may say that it is absurd to speak of Michael Angelo in connection with the teeth; that he was a product of one of the great art periods of the world, and that this is a scientific age, and the teeth must be studied from the scientific and utilitarian stand-point. This is all true, and yet in all candor I ask you where is there an instance in the whole range of art work where a close regard for the models that nature gives is followed by such utilitarian results as when the shapes of the teeth are restored. So that we must conclude that Dr. Webb did not without reason invoke so often the spirit of the great master.

To consider the subject further from this standpoint, it is safe to say that the public would not long tolerate an oculist who snips off a part of the eyelid in order to operate more easily on the eye; or a surgeon who, in amputating a finger, cuts off an arm; and yet it will sit down in a comfortable modern dental chair and let the teeth be cut and hacked, and will try to believe it is all right, because the operator has the reputation of being a splendid dentist.

The tooth might not be as valuable as the eyelid or as the arm, but it was modeled by the same Great Designer, and the difference is in degree, and not in kind.

From the days when Dr. Dwinelle, in 1855, illustrated and described the method of restoring contours, and Drs. Atkinson and Varney, between 1860 and 1870, verified and extended that practice to the present day, many attempts have been made to follow it by men who have not always succeeded, because they have failed to see the full significance of a strict restoration of contours, and have not always prepared their cavities so as to get free margins, and have not always built their fillings out so that when finished the teeth shall have firm lateral support and the gum perfect protection.

To a certain extent, it is unfair to admit the testimony of such

operators against contour-filling. The system of restorations is one that must be practised thoroughly if it is practised at all. Wherever contours are attempted, they should be made so as to touch at or near the grinding end of the tooth. Dr. Dwinelle puts the whole subject in a nutshell when he says: "The teeth should be made to impinge at their point of largest circumference." There can be no compromise here. If even a slight space be left between them at this point, food will crowd through and lodge against the gum, and cause all the annoyance of the worst kind of permanent separations. This is so important that I should go to the other extreme and say that it is unnecessary, and sometimes unwise, to fully restore teeth that, from the loss of a neighbor or a change in the occlusion, must eventually move slightly apart. I think it better to anticipate such inevitable and permanent change of position, and make at once a free parallel-sided space down to the gums; for such a space is less annoying than one wide at the gums and narrow at the grinding ends of the teeth.

You will see by this that I do not advocate contour for contour's sake. However much we may admire the form of the tooth, and however strong our desire to reproduce it, this must not be done if it is not to the advantage of the patient. The utilitarian side of the question must always be considered first. I wish to state this with great clearness, lest it may appear that my bias is for contour in order to keep alive my reverence for nature, and to satisfy my love of form and outline. It must be admitted that this parallel-sided space, so made that the teeth do not touch and the food does not become impacted against the gum, is one that, if it can be maintained permanently, gives a good result. It is the only separation between the bicuspids and molars that, from my standpoint of observation, can be justified. In effect, in a very modified way, it is like the extraction of a tooth. But the conditions do not often occur where it can be safely made. When free to move, the teeth migrate; and such a space as this must not be made unless the teeth will be held in place by the occlusion. Movement of the teeth is always in the direction of least resistance; and if they are cut and allowed to move, not even an operator of long experience can always tell where they will be found after a few years have gone by. The cutting between sound teeth in anticipation of decay, so loudly lauded by some operators a few years ago, was a part of the Arthur system, and will die with it.

I have given some of the reasons why I am an advocate of the estoration of the shapes of the teeth. There are many more, and

some of them are as important and convincing as any I have stated. In fact, there are so many reasons for that practice that, unless I deny the logic of experience and reject the evidence of my senses. there can be no choice for me but to adopt it. I cannot believe that my bias has led me to see the subject out of its true proportions; for, whatever the practice may still be, I hear from all sides strong expressions of regret that Dr. Arthur's book was ever published. And, by the way, is it not a curious fact that a man who had been one of the first to discover the cohesive properties of gold, by the means of which the shapes of the teeth could be restored, should have advocated the permanent separation of them? But even his faith in that system was not so strong as his book, to a superficial reader, would imply; and I could quote from his letters to me to show that the book was written for the profession as he knew it, and not for it as it might and would be. He was too honest not to admit that, for those who could and would make restorations, that that was the best practice.

Some years since, Dr. E. J. Dunning, one of the most accurate workers ever known to the profession, said to me that it was the regret of his life that he had ever cut the teeth so much. And only a few days ago I had the supreme satisfaction of being strengthened and confirmed in my faith in this practice by hearing Dr. Benj. Lord, whose conscientiousness and earnestness are known whereever the language is spoken, and whose enthusiasm for the art of saving teeth grows stronger and glows warmer with his advancing years, say that it was the regret of his professional life that he ever fell into the practice of cutting away and shaping proximate surfaces in order to secure permanent separations after filling, and also that he advocated as well as practiced filing and shaping the teeth to prevent decay.

I have had deep feeling on this subject for a great many years, and you must pardon me if I give utterance to the satisfaction I feel when I hear such words as these. And you must let me further express the pleasure I feel in knowing that Drs. Dwinelle and Atkinson, pioneers in this work, are here with us, spared to see the day when the irresistable tide of ripened professional judgment sets in their direction.

If I have spoken severely of the injuries done to the teeth by the system of permanent separations, I must not overlook the fact that it is a system that has some merit, otherwise it never could have been so long and so widely practiced. There can be no question that innumerable numbers of teeth have been saved by it. But those were the ones that ran the gauntlet and escaped the danger. And after all it is this risk and danger that I want to see our profession freed from.

We must also be careful not to allow a suggestion of harshness in speaking of the early operators who practiced the system. They did the best they could. They did not have the conveniences and appliances of the present day; and, moreover, sufficient time had not elapsed for them to see the evil effects of that practice. Dr. Arthur, who did more than any other man to establish the system, must be spoken of only in terms of respect, for he did in his day and in his way only what he thought was best for the profession. Nothing would be more ungracious than to speak in any but the most charitable terms of these operators, who did not and could not do in early professional life what can be easily accomplished at the present day. If we attempt to measure by too high a standard, where shall we find one of us who will not be too short. Let us overlook the past and be thankful for the bright future before us, remembering always that to be charitable and helpful to each other is to do most to advance the cause of our beloved profession.

There is still another side to the subject that must not be allowed to pass without consideration. Partly by its own impulse the pendulum swings to the other side of its arc, and some of the best operators, repelled by the evils of permanent separations, have gone to the other extreme, and in their eagerness to restore the teeth have cut them away far more than necessary, and have given themselves and their patients needless trouble in restoring them. In my judgment this was an error constantly made by both Drs. Varney and Webb. If this can be justly said of those accurate workers of gold, with how much more force does it apply to those who follow the same plan, but are not such accurate operators? I am fully convinced that it is an error which I have many times committed, and it is one that any one may easily fall into if they have not come to have, what I will venture to call, reverence for the natural teeth. It is one that has been encouraged by the use of the dental engine and by the use of cohesive gold. A graduate of one of our colleges came to me with hardly a dozen excavators, and those of the most useless kind, in his outfit. He prepared his cavities mainly with the dental engine. It is not surprising that a man like Maynard refuses to believe that modern dentistry has made the progress claimed for it. A disheartening picture could be drawn if one felt inclined to contemplate the injury that has been done by confining operations on the teeth

within such narrow lines. To ignore the advantages of soft foil and to be unskilled in its use is a misfortune to the patient, to the dentist and to the profession. The man is dwarfed who is not as ready to apply one system as the other.

It would be better for our patients and better for dentistry if we could keep more in mind the idea that the human teeth are marvelous structures and worthy of the most patient and painstaking efforts of the most accomplished men in the world.

And whatever method is employed they never will be saved without this painstaking care. While the physical properties of gold remain what they are it is useless to hope for any easy method of filling with it large cavities on the proximate surfaces of the bicuspids and molars. It always has been and always will be absolutely impossible to get a good result without hard work, so that in selecting the method we may as well dismiss at once the idea of finding an easy one. The search for such a one has resulted in an immense amount of bad work. The search for a rapid one is equally misleading. Under the pressure of a large practice it has done more to keep my own work below the standard I could wish to work to, than all other causes combined. If plastics are used the same patient care is necessary, if we are to get good results. In the very nature of things there can be no easy way to permanent success of any kind.

[The conclusion of Dr. Perry's paper will be found in the March number and will discuss the practical treatment of the proximate surfaces of the teeth.—Ed.]

REGULATORS AND METHODS OF CORRECTING IRREGULARITIES.

BY W. G. A. BONWILL, D. D. S., PHILADELPHIA.

(CONCLUDED.)

I have had the greatest satisfaction in the use of gutta-percha on the proximal surfaces of the temporary molars, which, as long as it can be kept in them, spreads the jaws or keeps the permanent molars from crowding forward.

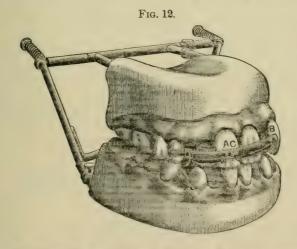
The trouble has always been to get hold of any of the temporary teeth, as a fulcrum.

It has been my practice for years first to make use of the silk igature and rubber bands without plates. To do so, how shall

the ligature be prevented then from slipping off the permanent tooth, or from slipping down over the temporary tooth, which is being used as the fulcrum.

I argue that, as the temporary cuspids and first molars will soon be lost after the permanent lateral incisors have come and are high enough to get hold of, it is well to cut a slot with a small hard-rubber disk on their buccal and palatal surfaces deep enough to hold the ligature, which keeps it from ever passing down under the gum, Fig. 22. If a plate of rubber or metal must be made for the inside, use the same grooves to hold the plate in position.

If a clasp is needed, which is most frequently the case in the use of the new appliance, presently to be shown, cut the first temporary molar on its mesial and distal surfaces, a little under parallel, as in Fig. 23, and the strain is so slight that it is not uplifted before the lateral incisor has been drawn into the circle. If there is any danger from the ligature wounding the gum, place guttapercha underneath. If I want to pass a ligature around a perma-



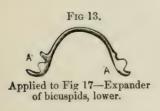
nent tooth (Figs. 12 and 17) as a fulcrum, I simply warm a small piece of gutta-percha and press it on the palatal or lingual side of the tooth, letting it extend slightly down on the gums, and when cold remove, cut two holes to let the ligature pass through it, and then between the teeth, and tie outside to the rubber band. This little adjunct cannot be overpraised; for it is so soon adjusted, is pleasant to the patient and non-irritating to the tissues. If a metal wire or band is pressing into the gums, and a hook cannot be used on the grinding surface, the gutta-percha fills the need:

and it answers well as a fulcrum by letting the band directly into the gutta-percha or by attaching it to the wire or silk ligature that holds the former.

The lower jaw partially shows the application of the gutta-percha stay-plate (see Fig. 11) for keeping the ligature off the gum at the crevix, on the first molar. The lower jaw in this case (see Fig. 12) being too large an arch for the upper, I extracted the first right bicuspid; and as the right lateral inferior incisor was too far in the arch, and the right cuspid very far outside, I simply ligated the first inferior molar on the same side. A piece of pink base-plate gutta-percha was warmed and pressed up against the molar, letting it rest partially on the adjoining teeth (see Fig. 11); when Fig. 11. cold, two holes were made in it for the passage of the

Fig. 11. cold, two holes were made in it for the passage of the ligature, which was tied on the buccal surface of the molar. A rubber band was tied to the inside before adjusting. A ligature was then cast around the right lateral, carried up between it and the cuspid, and over it through

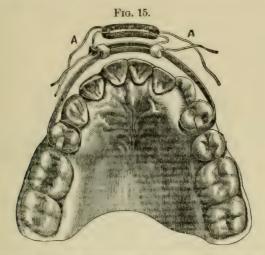
Applied in Figs. 12&17. carried up between it and the cuspid, and over it through the space where the first bicuspid was extracted, on the lingual side of the first bicuspid, and tied to the rubber band attached to the gutta-percha stay or helmet on the first molar, and stretched over the buccal surface of the cuspid. This drew the lateral out very forcibly. The ligature was lastly placed on the cuspid alone, and remained for six weeks without change. The same appliance shown in Fig. 11 is also applied in Fig. 17. This was a very contracted lower arch with a deep underbite. The arch was first expanded by the fixture shown in Fig. 13, made of piano wire, with half clasps





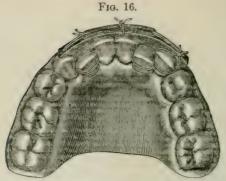
Shown as applied, Fig. 15.

of platinized gold at A A, made with small ears to rest on the grinding surfaces of the first bicuspids to prevent slipping down upon the gums. These clasps were soft-soldered to retain the full temper of the piano wire as a spring. It is a very cheap and easy way of making such an apparatus and with a powerful spring which such cases demand.



In this case I could not afford to extract any teeth, because the incisors were already touching the gums on palatal side of the superior centrals. In expanding the lower arch I obviated this deep over and underbite. The left lateral was very far inside the arch, and the cuspid so far as nearly to allow the bicuspid to touch the lateral. The silk ligature was first placed over the lateral and carried up next the cuspid. The first bicuspid was ligated with a stay-plate or helmet of gutta-percha on its lingual side with the ligature running through both holes and carried around the first bicuspid and tied on the buccal side. This prevented entirely the slipping of the ligature upon the crevix. A rubber band was then stretched between the lateral and the bicuspid and secured. This expanded the arch in front and drew out the lateral very quickly. These little gutta-percha caps or helmets work admirably, and are not displaced in mastication.

Fig. 14 is another modification of Fig 10, the single bar, and is applied in Fig. 15, where the four superior incisors are to be moved forward from one-fourth to three-eights of an inch and the whole arch expanded to meet the more perfect and larger arch in the lower. It is made of two flat bars of platinized gold sliding over each other for at least two inches. A loop is soldered to the end of each flat bar as guides to hold them in place while sliding through. A rubber band is shown attached to the end of each bar at AA, which, in contracting, enlarges the circle, and consequently not only throws out the incisors, but the bicuspids and cuspids as well.



The attachments are made on either side to a molar or a bicuspid, owing to the ease of clasping. I have utilized the decay on the anterior surface of a molar by filling with amalgam, and cutting a hole for one end of the bar to rest in instead of using a clasp.

The apparatus is shown applied in Fig. 15, with the bars some distance away from the incisors to be moved.

Before the apparatus is placed permanently in position, the four incisors are ligated with a loop, as shown in Fig. 22, using gum sandarach varnish to prevent slipping or turning on the tooth. The ligature should be so adjusted as to twist the tooth, if needed, while drawing it forward. These are then tied to the sliding bars, bringing them closely in contact with all the teeth in the arch. The rubber band is then tied between the two points AA, and the application is complete. It is easy to see not only its simplicity, but also its great effectiveness. It can be used equally well for contracting an arch.

Fig. 17.

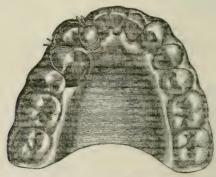
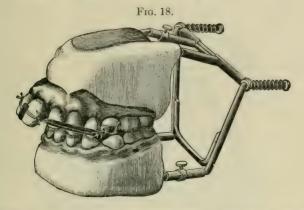


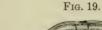
Fig. 18 shows the worst case of protrusion of the upper jaw I have ever seen. It did not arise from an acquired habit, nor did

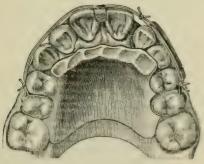
it have any precedence in heredity. The temporary teeth had proper arches. No cause could be assigned. They came as you



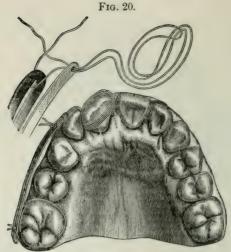
see in Fig. 18. The lower incisors, when I first saw the case, were three-eighths of an inch from the superior incisors on their palatal surface, and were imbedded in the gums on the hard palate.

Before attempting to draw in the incisors I made a rubber plate (Fig. 19) to cover the hard palate, thickened where the lower teeth would touch, and opened the jaws at the bicuspids at least one-eighth of an inch. This was not only to drive the inferior



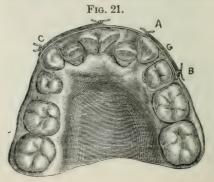


meisors up into their sockets, but also to allow the bicuspids and molars to come down and antagonize before the plate was removed. Two years were consumed in this. To this plate was then attached a rubber band carried entirely around the arch with a silk ligature, and a metal hook, with two holes, was carried over the cutting edge of the central incisors, through which the ligature passed. This kept the ligature down on the incisors near the cutting



edges, and while it was aiding in drawing in the arches, it did another important thing: forced the centrals up into the alveolus. This was done by the tendency of the rubber band to work up towards the gums, and at the same time it pressed them up and made them shorter without grinding. This was a case parallel with the one delineated by Dr. Kingsley in "Oral Deformities," but without any of the treatment given there. The sliding band in Fig. 14 would have done well here, but I adopted the simpler one of ligature and rubber. A gold band, running over the arch from the second bicuspids, which was soldered to clasps around the latter, and which could be adjusted or removed by the patient, was used to secure it in position.

The rubber plate was removed as soon as I began to draw the incisors into the arch, to allow them to adapt themselves to the smaller arch. Fig. 21 shows the application of the band to the lower

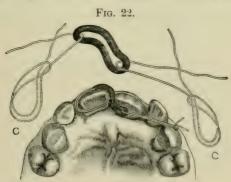


jaw where the temporary molars were still in place. The permanent laterals were far inside the arch. The temporary cuspids also remained. The first molar had had its sides squared to retain a clasp. A platinized gold bar similar to Fig. 10, with clasps, was used with holes at the end of bar C., and opposite the right central incisor with another over the centre of the right temporary cuspid at G, and the fourth hole at the end of bar near the first molar at B.

The principal feature about this method, aside from the bar, was the cutting so heroically the temporary molars for retaining the plate. This does no injury, and if it was likely to would make little difference, as they would soon have to be extracted in order to make room for the bicuspids.

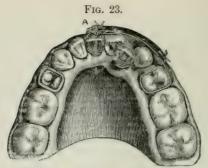
The ligatures are applied, as in all cases where this bar has been used, so as to press backward as well as drawing outward. In this case two separate pieces of rubber band were used.

Fig. 22. The feature about this case which made it novel and unique was the utilization of the superior temporary cuspids for holding the ligature. To place a ligature on the temporary teeth insures their removal or extraction without this plan. To keep the ligature on the body of the tooth, I take a small hard-rubber corundum disk and make a groove on both the labial and palatal sides of the cuspid, deep enough for the ligature to rest securely. If necessary, I should cut the first or second temporary molars if a ligature could be gotten around the incisors to be turned into place.



The rubber band was drawn through between the centrals, which gave it more power over the incisors. The left superior lateral was soon placed in the arch.

Fig. 23 shows the cut surface in the first temporary molar on the left and the tooth on the right with the clasp around it attached to the bar. The ligature passes between the lateral over



the central and through the hole in bar at A, pressing the central to the left and the molar to right.

The utilization of the temporary molars, in cutting them for clasping, or by guooving for ligatures, cannot be overestimated. They thus form fulcrums, which may be utilized early in the treatment of the case, which heretofore has baffled our skill. The sooner we begin to correct irregularity the easier and more complete our result.

The explanation of geometrical law, and the value of the anatomical articulation in showing how the first permanent molar plays so important a part in making the lower incisors roll over one another, and thus make a smaller arch with a very deep under and overbite where seen. I am almost quite ready to say, never extract the first permanent molar. Keep down the inferior incisors. Have the permanent molar take its place soon and rapidly in the arch. Drive it backward toward the ramus rather than have it move forward to make the underbite too deep.

To a person of any comprehension these are simple devices and plain rules; the application can be made to any case of irregularity. Any one can surely make the apparatus. Whoever hereafter shall undertake this branch of practice should first read my article on the geometrical law of articulation and study the principles involved, and not attempt wildly to do what but few men have ever truly fathomed. Really, in every city, some one should make of this a special practice, and the profession should encourage such by sending cases for his inspection and consultation. And such a specialist should do all he can in return to teach by example and demonstrations by clinics, to enlighten those who are placed so far from large cities that they are compelled to take such cases. When we can have that understanding between us, then we may feel as banded brothers more fully equipped for these hitherto difficult and almost thankless operations.

THE IMPLANTATION OF TEETH.*

BY G. L. CURTIS, M.D., D.D.S., SYRACUSE, N. Y.

As the scientific aspect of this subject has so recently been considered, your attention to-day will be directed to the practical side of this comparatively new field in dental surgery. Few subjects in our profession have been more generally and more thoroughly deliberated over than this. While at present many are not sanguine that this method of restoring the lost organ will be ultimately successful, it must be remembered that our work is largely experimental. We are meeting the failures as they appear, and endeavoring to overcome them. Farther than this, we are devising new ways whereby natural teeth can be permanently fixed in the jaw. If perfection has not already been attained, it will, we are confident, be reached in due season. Where there is a demand, the way to supply it generally exists. If the world-renowned American dentist, with his intelligence, energy and ambition cannot accomplish the task before him, then he must "call upon the angels for inspiration."

For three years implantation, which already may be pronounced a justifiable and proper practice, has been prosecuted with the most gratifying results. I take pleasure in reporting to you that teeth thus embedded in the jaw two years ago remain intact, and are as useful, and to all appearances as healthy, as any others in the arch.

We are experimenting in this work entirely from a scientific point of view, and under the most favorable conditions. Hence our failures, when they do occur, enable us to consider the causes, and lead us to the discovery of better modes of operating. Is it strange that failures have to be recorded? Hundreds of teeth have been implanted; many of them under circumstances most unpromising, and by operators who for the first time performed a surgical operation greater than the extraction of a molar, and whose knowledge of surgery and pathology never extended beyond the carious tooth. Name the surgeon who, after years of experience, is prepared to affirm that he knows that his operations will be successes, and you have pronounced the name of a knave.

I have little sympathy with those who condemn every venture in scientific work, and who are ready to ridicule and censure all whose methods differ from their own. By our failures we learn to

^{*} Read before the New Jersey State Society, at its Eighteenth Annual Session, held at Asbury Park, July 19, 1888.

overcome the obstacles in the path to success. Were we afraid to explore the unknown, or were we restrained by rigid dogmas, advancement would be impossible.

In performing implantation, the fully developed and healthy tooth is best adapted for the work. The objection to teeth of the youth, such as are removed in correcting irregularities, is that the root is undeveloped, while those from the patient of advanced years are prone to disease or are already affected. When teeth intended for implantation have become dry, they should be allowed to remain for a few days in a weak solution of bichloride of mercury—about one to five thousand. By this means the original color will be restored, and the chances of fracturing them while cleansing the canal are lessened. When the alveolar wall is almost or quite absorbed, only the longest teeth can be used, and the articulation maintained. In the last named case, roots with artificial crowns attached will supply the demand. These can also be employed when the palatal root of a molar is used to supply the loss of a lateral incisor.

Too much stress cannot be laid on the importance of selecting suitable teeth and of choosing the mode of operation demanded by the case under treatment. When the alveolar ridge is full and well developed, the condition is the most favorable. When it is atrophied, short teeth, or those with long crowns should be selected. This permits a complete embedding of the cementum, and thus the chances from exposure to septic influences are reduced. As living substances readily unite, we argue that freshly extracted teeth can best be employed. Their dentinal fibres and cementum are prepared to continue life, while experiments show that dried and shriveled teeth have lost the capacity of taking on life again. In the dry tooth checking has perhaps resulted, thus diminishing the chances of durability.

In preparing the tooth, all foreign and unhealthy substances should be removed from it. I have seen teeth implanted with fragments of dead pericemental membrane, salivary calculus and even parts of abscess sacks clinging to the cementum. It is hardly necessary to add that in such cases the results will likely be disastrous. The removal of the pulp and the filling of the canal can best be accomplished through an opening made in the palatal or masticating surface. Gutta-percha is probably the best filling substance. Opening through the root wounds the cementum, and increases the chances of absorption. Indeed, the wound caused by the use of the forceps during the process of extraction may be

the beginning of the breaking down of the cementum, as has been shown in the brief history of implantation.

In selecting patients for this operation, the scrofulous, those in the primary or secondary stage of syphilis, those affected by any wasting disease, and those whose system is overtaxed, or who are in the period of gestation, should be declined. It is clear that such persons are not in a condition of body which will result in quick or satisfactory healing.

In forming the socket, great care should be observed to obtain an accurate adjustment of the root. If this is done, nature in her work of reproducing the bone tissue is less taxed, while the likelihood of absorption is lessened. When the alveolar ridge is entirely wanting, and the other conditions are favorable, cut through into the substance of the bone and insert the tooth. This can be done with the same assurances of firm attachment as in the other operations. The danger of penetrating the antrum should not be overlooked; yet in cases where this has occurred no ill results have been reported.

When all is ready for the insertion of the tooth, place it for a few minutes in the sterilizing solution, the temperature being slightly above that of the body. This prevents the coagulation of the blood from the wounded bone. At the same time syringe the socket with a similar solution, and remove all clotted blood and fragments of bone. This done, press the tooth firmly in place, and anchor it to an adjoining tooth. The firm retention of the implanted organ in its new position until the process of healing is complete, by means of a staple or clasp, is essential. This fact was thoroughly demonstrated in the papers read at the last annual meeting of the First District Dental Society of New York.

If undue inflammation occurs, meet it as in the case of an acute abscess, the cold compress being one of the most effective agents.

In the cases of failures reported, there appeared to be two methods of the absorption of the root. In the first, bacteria play an important part; and, in the second, the bone cells, in penetrating the cementum and dentine, apparently know no limit, and the root is disposed of as in sponge grafting. Finally the crown, receiving support only by its attachment to the periosteum, requires but a slight pressure to be displaced.

Cannot the success of implantation in a measure at least be attributed to natural organization or condition, that is, to the temperament? In view of the remarkable differences that exist among

individuals, in consequence of the variety of the relations and proportions of the constituent parts of the body, does it not seem reasonable that teeth implanted with due regard to these conditions will be more likely to be permanently retained? May not this also account for the promptness of the healing process, and the readiness with which some teeth assume the color of their neighbors? Thus, teeth belonging to the bilious temperament, when placed under like influences, assume a normal condition and remain in it more readily than when these relations are antagonistic. The color, however, might be accounted for by the pigment peculiar to the possession of the tooth, as in all cases we do not find a perfect blending of shades. Again, this may be attributed to the septic influence of the devitalized dentinal fibres remaining in the tooth. This point is open for your consideration.

The introduction of implantation has already proved a great benefit to our profession, and its beneficent work is but begun. The investigators who have taken up this work deserve commendation; but special praise is due to him who first conceived the idea, and first put it in execution. The work already done, even if it shall prove to have been largely misdirected, will surely lead to a method whereby teeth can be permanently attached in the edentulous jaw. Thus, if bone cells have to do with the destruction of the roots as in sponge grafting, cannot the root be partly surrounded with an impervious substance which will be retained in the jaw, and which will hold the crown when the root is thrown off?

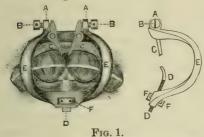
I am glad to see so much interest manifested in this subject here, and apparently in its favor. I have been surprised to find almost every one condemning the operation heretofore. It is true that a few failures have been reported, and they seem to have been selected with a view of destroying the confidene of the profession in the operation by men who are positively opposed to it; for what reason I do not know.

But the success which has already been reached under the present methods commends implantation to the scientific dentist, as well as to the crippled patient; for who is more maimed than he who has been the prey of the hungry knight of the forceps? For years the need of better substitutes than artificial dentures has been keenly felt, and have we not strong ground to hope that this need was answered when Dr. Younger introduced to the world this astonishing innovation in dental science?

IMPROVED SEPARATOR FOR THE INCISORS, CUSPIDS AND BICUSPIDS.

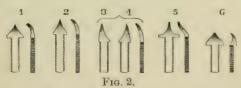
BY W. A. WOODWARD, D.D.S., NEW YORK, N. Y.

In the construction of the separator, a description of which was published in May, 1886,* a headed screw was passed through a post set on the frame and forced between the blades or levers which separated the teeth. This headed screw, while very effective, was found to be in the way of the finishing appliances, preventing the polishing strips and disks from reaching the cervical margins of some fillings.



Two posts, AA, have since been added to the frame, EE. Through these posts pass the screws, BB, which engage the extended levers, cc, in such manner that the space between the levers is free for access in filling or finishing. These levers are operated independ-

ently of each other, which increases the adaptability of the separator. The sliding bar, D, has been much improved. It is now made flat, with threaded edges, and moves in a suitable slot in the frame, E, and is operated by turning the milled nut, F, also set in a slot at a right angle to the former. This milled nut has a number of holes drilled in it, and with any suitable pointed instrument can be turned when the separator is in position on the teeth, an advantage of much convenience where the teeth are narrow at their necks. Both the nut and the bar are securely held in place at all times and cannot become accidentally detached. The range of movement of this sliding bar, D, is considerable, which adapts the separator equally as well to broad bicuspids as to the lower incisor teeth.



There are six shapes used, and these are quickly changed by operating the milled nut, r, with the thumb and fingers. Numbers 1 and 2 are for general application. The slight variation in their

^{*} See Dental Cosmos, vol. xxviii, page 285.

size and shape will be found effective, often where least expected. Numbers 3 and 4 are rights and lefts for the space between the cuspid and bicuspid teeth. This has proved a difficult space to manage, owing to the unequal width of the crowns of these teeth and the inclining palatal surface of the cuspid. These bars work admirably for this space, and allow the separator frame to set squarely and in line with the arch of the teeth. As the levers, c c, work independently, by moving one or the other, the frame of the separator can be made to clear or impinge upon the cusps or other surfaces of the teeth at will.

Number 5 is for short teeth in close contact, with the gum extending low down on the crowns, and the teeth projecting somewhat. It is also of use for the lower front teeth. The hold is obtained by the slender point sliding under the free margin of the gum between the teeth at their necks. Number 6 is a recent addition for bicuspids. Numbers 1 and 2 are also used for bicuspids.

In selecting a bar, one is frequently found to answer nicely for a space for which it was not intended. To illustrate: Numbers 3 and 4 can be used between a cuspid and a twisted lateral incisor, the bar for the left side sometimes answering effectively for the right.

To adjust the separator, a suitable sliding bar is first selected and placed in the frame. It is then moved, with the milled nut, until the separator will just pass over the teeth. When in position, the sliding bar is advanced between the teeth by turning the nut, do not be siding bar is advanced between the same space labially. The screws, begins are then turned at intervals, moving the levers, cc, apart, thus separating the teeth. To prevent contact with the gum when the teeth are short, wedges of wood or small pieces of warmed red base plate gutta-percha may be placed between the frame of the separator and the teeth over which it passes. This will keep the levers, cc, and point of sliding bar, d, free of the gum in the few cases where it may be required. These modifications add much to the efficiency of the separator and extend its range of application.

Reports of Society Meetings.

THE ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

Especially Reported for the International by I. G. Baumgardner, D.D.S.

The regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, December 1, 1888, at Justi's Rooms, Arch and Thirteenth streets. President Kirk in the Chair.

INCIDENTS OF PRACTICE.

Dr. C. N. Pierce—About three weeks ago I implanted the left superior lateral incisor, and although it is early to predict results yet, to-day it has the appearance of being in every way satisfactory. There is nothing especially worthy of note in the case, save that the patient had been wearing an artificial lateral attached to the cuspid, with its base resting upon the gum without protection. The constant pressure had caused absorption, not only of the gum, but also of the labial process, so that the tissue was quite deficient. An incision was made in the gum so as to protect it as much as possible. Then, with some drills obtained through the kindness of Dr. Kirk, a hole of suitable size to receive the root of the selected tooth was made, and the tooth inserted and retained without ligatures, the slight twist or curve in the root being sufficient to hold it in place.

In drilling the process a small piece of the apical end of the original root was found, but in no way interfered with the progress of the operation nor with its ultimate success, judging from its present appearance, which is only slightly marred by a deficiency of gum on the labial surface.

I would like to ask, are we not every year more indebted to antiseptics? The use of mouth-washes preserve the teeth and prevent the progress of decay. During the last two or three years I have had very good results from antiseptic washes, and I am satisfied that in persons between eight and twenty and in adult life, where there is a tendency, it modifies the progress of caries, and will protect our work and protect us. Years ago I used to speak slightingly of mouth-washes. I thought powders were better than washes, but am convinced that if properly prepared, free from foreign substances, they are an advantage in the preservation of the teeth.

Dr. Jefferis.—A case presented itself to me a few weeks ago—a wisdom tooth, that from its position could not erupt. It was in

the mouth of a gentleman about 30 years of age, who had suffered quite a while with neuralgia. He had splendid, large teeth, and had, at the advice of a dentist, his left superior wisdom tooth extracted, from the supposition that crowded teeth caused the neuralgia. This, however, afforded no relief. He fell into my hands about three weeks ago, and upon examining the place where the tooth was I found a single root, which I removed, and found it to be the root of a wisdom tooth. In searching further with an excavator, I observed by sounding away up on a line with the roots of the other molar teeth what appeared to be a crown of a tooth. I extracted the second molar and found a fully developed wisdom tooth, with a long root, which was the cause of the neuralgia, and which I also extracted. It was a case of a second wisdom tooth in the same place.

Dr. H. C. Register—As it is desirable to keep a record of the implantation cases, I report one performed upon Prof. P., of Jefferson Medical College, this city. He had been using an artificial crown upon the R. S. lateral for several years, but was unforunate enough, while in Europe this past summer, to fracture the root longitudinally; and as the crown was very short, the teeth striking directly upon their cutting edges, I deemed it best to try implantation in preference to using plate or bridge, and extracted the root and inserted a natural tooth at the same sitting. The operation differed a little from the ordinary implantation operations, as there was a natural socket already formed, but not of sufficient depth to receive the tooth; and I deepened it, and after disinfecting and filling canal of tooth, forced it into position under pressure of a wood cushion forcibly malletted into position. There was little or no mobility about the tooth after its insertion. The operation was followed with little soreness, which disappeared after the third or fourth day, except when pressure was made. There was a little mobility during these several days of soreness, but no disposition for the tooth to elongate. After the seventh or eighth day, in response to tapping, there was no soreness, and the sound indicating direct union with the bony tissue. The gum festoon lies as perfectly as upon any of the other teeth. There was no issue of pus following the operation, and after the fourteenth or fifteenth day the patient used it as he would any of his other teeth.

I wrote to Professor P. in regard to his case, and received the following reply:

"I have not the date of the 'planting,' but for nearly a month after I was occasionally painfully reminded of the new tooth.

However, by the end of the month it seemed firm, and gradually all sensitiveness upon moderate pressure disappeared. The tooth now is almost as useful as its predecessor, even in its best days; only a little discomfort when very firm pressure is made in eating; but this discomfort is only trivial and temporary."

Dr. Kirk.—Whatever may be said of tobacco on moral grounds, there is certainly a retarding of decay in the teeth of those who use tobacco, whether it be smoked or chewed. I draw attention to it because it is an instance of an antiseptic material in the mouth giving indisputable results in the arrest and retarding of caries. If one antiseptic will do it, why not another?

Dr. James Truman.-It seems to me that Prof. Pierce has touched an important question. Antiseptics will, without doubt, occupy a leading position in the therapy of the future. This is true of dentistry at the present time. The large number of microorganic forms found in the oval cavity lead to the inference that disease, both general and special, should be met and combatted. Pathogenic forms should be destroyed before they have time to enter the general circulation. Very little attention is paid to this in general practice. Antiseptics will be freely used in sick rooms. but the mouths of those exposed to contagious diseases are probably never looked after. The time is certainly coming when the condition of the mouth will be examined by the general practitioner with more care than he does now the sanitary state of the sick room. My view is that if an antiseptic be used regularly two or three times a day, and especially at night before retiring, there would be but little to fear from contagion through the atmosphere. It is not, I think, necessary that a germicide be used, the inhibiting property of many agents may be quite sufficient, and if used in the form of spray, as recommended by Dr. H. C. Register, the effect must be better, not only in the mouth, but in the air-passages, where it can be applied effectively.

Dr. Register.—Dr. Truman kindly referred to the spray apparatus used in my practice. It is really wonderful to note the benefits to those who use an antiseptic through an atomizer. When patients come to me semi-annually or annually I notice that in mouths that with the greatest difficulty were kept in good condition formerly, and in which is now used the atomizer, there is a very decided improvement. The word decided hardly expresses it. The mouth is clean, the surfaces of the teeth are clean. The places (boundary lines) that are protected by fillings are cleaner than ever I have known them to be since I commenced practice. Among

simple anæsthetics recently recommended is oil of peppermint—children are very fond of it, tasting like candy, and these little people, as well as older patients, have no difficulty in forming habits of using the atomizer and washing away these gummy substances that cling in the interstices of teeth, and which, in my judgment, are the principal cause of caries, being the medium in which bacteria reside and luxuriantly grow, while feeding upon the oral environment and decalcified tooth matter, acidulating and degenerate organisms being coincident.

Dr. C. N. Pierce—I would like to ask Dr. Sudduth whether in his investigations he has found an antiseptic that is best for all cases?

Dr. Sudduth—While I have given considerable attention to the subject, I am not ready to report. Of the three classes of antiseptics required in the mouth, I am satisfied that bichloride of mercury is the best we can use in root canals, where no deleterious results can arise from its use. Then for a stimulant antiseptic, we have carbolic acid. I have not yet decided upon one for daily use in the mouth. Hydronapthol has been recommended, also silicafluoride of soda with its different combinations of zinc and bismuth. My investigations have not progressed sufficiently to unqualifiedly recommend any of these; silica-fluoride of soda inhibits the development of moulds and fungi in general. Oil of peppermint, wintergreen and cinnamon make good antiseptics and are not objectionable when used in the mouth.

Dr. Kirk-Listerine is a very agreeable antiseptic mouth wash.

NEW JERSEY STATE DENTAL SOCIETY.

JULY, 1883.

ESPECIALLY REPORTED FOR THE INTERNATIONAL, DISCUSSION ON DR. CURTIS' PAPER ON IMPLANTATION.

Dr. E. C. Kirk, Phila.—Mr. President, unfortunately I was not present when the first part of Dr. Curtis' paper was read. The subject of implantation is one that interests me a great deal. The first case that I had an opportunity to operate upon was in November, 1886. That case, together with thirty-eight others up to today, have been entirely satisfactory, both to myself and to the patients for whom I have operated. There have been two instances in which I have lost implanted teeth. One was reported in the Dental Cosmos some time ago, and was where I implanted two teeth

for a patient who had been suffering from secondary syphilis, which I was not aware of at the time. A more recent one in the mouth of a gentleman whom I took to be a typically favorable case for the operation; he was free from all constitutional vice whatsoever, and was a man of fine physique and apparently in excellent health. The tooth was selected with the same care as the other, and I am entirely at a loss to account for the failure of the operation, which occurred five or six months afterwards by absorption of the root.

We are all sufficiently familiar with the fact that teeth can become united with the alveolar process in this method of implantation introduced by Dr. Younger. The point of special interest is, how long will they last, and what are the conditions necessary to the permanency of the operation. The investigations made by our histologists, Drs. Miller, Heitzmann, Sudduth and others in this direction, seem to show that these implanted teeth are held in place or attached simply by the process of encapsulation, and I think it is unfortunate that Dr. Younger propounded the theory that the peridental membrane would become revitalized after having been separated from its normal surroundings for a considerable length of time, for that theory seems to have been disproven.

The question of the length of time an extracted tooth can remain out of the mouth and be successfully implanted is an interesting one. I have implanted teeth that had been out of the mouth from a year to eighteen months. Within the past six months I have had a letter from my friend D. H. C. Herring of Concord, North Carolina, for whom I performed this operation, stating that he has since then, in his own practice, implanted a number of teeth, among them an incisor tooth which had been extracted seventeen years previously, union taking place without difficulty. The question of the revitalization of the peridental membrane in that case would seem to be entirely eliminated. It seems unreasonable to suppose that the membrane can retain its vitality for any great length of time. I believe that a few hours settles the question of its vitality. Theoretically it seems possible that a tooth devoid of peridental membrane may become attached after implantation. I do not mean to say it will be attached as readily, or that the conditions are just as favorable; but I see no reason why a tooth denuded of its pericementum should not become attached if the process of attachment is one of encapsulation of the root. My belief is that the old dry membrane presents a condition that is more acceptable to the tissues around an implanted tooth, which are more or less irritated by the presence of that foreign body. I think the whole secret of the

successful results depends upon controlling the inflammatory process following the operation, so that it shall not at any time exceed the amount necessary to produce repair of the tissue. If the inflammation becomes excessive, nature makes an effort to get rid of the cause, and pus is formed. To avoid this result it is necessary to use, as Dr. Younger did, thorough antiseptic precaution to keep the inflammatory process within the limits necessary to bring about encapsulation.

With regard to the ultimate success of the operation, the two cases I have mentioned have, I think, considerable bearing. It has been generally believed that we should not attempt an operation in cases of scrofulous diathesis, or where there is any systemic vice, such as syphilis, a strumous condition, tuberculosis, or during the period of gestation; yet I have had to report a case of failure in the mouth of a patient whom I believed to be in typically good health, the implanted tooth being lost by absorption of the root. I found that the root was almost completely absorbed. It is important to know why, in such a healthy and favorable looking case, absorption of the root should occur. I think that under-lying it all is the question of the status of the patient's nutrition, whether it is in a condition of equilibrium, or whether the balance is upon the side of repair or that of atrophy. I think the nutritive conditions are variable in the individual from time to time, and that may account for the favorable or unfavorable results obtained in the operation. It is exceedingly difficult to determine what the condition of these nutritive processes is at any given time. We have a familiar example in cases of pyorrhea alveolaris, where the patients are otherwise in a normal condition, and yet there is this local expression of what I regard as a systemic vice, which seems to depend upon some nervous nutritive control of the mucous membrane and ligamentous tissues of the mouth that has its expression only there. We find an atrophic variety of nasal catarrh, that being only a local expression of some error in the system, and which seems to be of nervous origin. The trophic centres presiding over those tissues seem to be in an abnormal condition. Just why one cell builds up and another breaks down, and just what the conditions are which control the process, it is difficult, if not impossible, for us to decide in our present state of knowledge; and until we do know more about it, and can select our subjects with more care and intelligence, we will have these cases of absorption of the root, no matter how careful we may be in the operation.

In general, it seems to me that there is a future for this opera-

tion that is full of promise, notwithstanding the percentage of failures that have been reported.

Dr. De Lange—I had the opportunity of witnessing some of Dr. Younger's operations in San Francisco, in December, 1886. With regard to the peridental membrane, Dr. Younger says he performed the operation of implantation in several cases where the tooth was denuded of its peridental membrane, and those cases were invariably failures.

Dr. Ivory—In two cases operated upon I have had success. A lady came into my office one day having a lower cuspid tooth on the right side with quite a large cavity in it, and she wanted it removed. She was a poor woman, and could not afford to have any filling done. I extracted the tooth and told her to wait a few minutes. I took the tooth into my laboratory and cut off the root, and drilled it out and filled it partly up with cement; then filled the root with gold to the apex, flushing it all over and around the end of the root. I filled the other part with cement. I replaced the tooth in the mouth merely as an experiment, telling her to come back in two weeks. She did so, and it seemed to be as firm as when it was put in. I cannot say how it is now, or whether there is anything more than a mechanical union.

Dr. Sudduth-I have had no practical experience myself in this operation; but I have studied somewhat the histological and pathological points that bear upon it, and I look very favorably upon the results to be obtained. The subject of implantation is not a new one, although it has been brought recently into prominence. I think that with our present knowledge of how to control inflammatory processes, and especially septic processes, we will have much better results from the operation than could have been obtained or expected in the earlier experiments in this direction. As regards the method of attachment, there is no doubt at all but what it is at first one of encapsulation, and following that, if the inflammatory conditions are kept in abeyance, we may get a bony anchylosis. The pericemental attachment of the teeth serve as a cushion between the root of the tooth and the bone, which in masticating serves to soften the blow. In the case of an implanted tooth we have no such fibrous tissue between, and if it is a case of bony anchylosis, the bone and the tooth come directly in contact, there is a different condition from that of a natural tooth, a condition which can be detected by the sound. If you tap with an instrument an implanted tooth it gives a hard resonant sound that is not perceived when a natural tooth in its original condition is

tapped in the same way. There evidently is no intervening membrane between the tooth root and the bone; and we must infer that such a tooth would be a weaker member than one which has been undisturbed. I think it is decidedly weaker as a bridge work post than a normal root would be, and great care should be taken not to place too much strain upon such teeth.

The operation is comparatively painless. If proper antiseptic precautions are taken there is very little or no danger of impregnating the surrounding tissue with disease.

The statement is made that a tooth had been implanted with success which had upon the end of its root calcific deposits. Implanting a tooth in that condition would, it seems to me, be almost criminal. I think that all antiseptic precautions should be taken before this operation is performed.

Another question in this connection that has been talked of between Dr. Kirk and myself is how far is a dentist justifiable in proceeding in surgical operations of this kind, in which disease may possibly follow, and how far is he protected by law in these operations. It would surely place adentist in a bad light if he were to be called before a grand jury to give expert testimony in regard to this matter, and he should be found to know nothing about antiseptic conditions and the means of preventing them. If the testimony showed that the dentist had implanted a tooth that had not been thoroughly antiseptized it would place him in a very bad position indeed, although he might be perfectly competent to perform the mechanical operation. But are we competent to take charge of such a case from its medical aspect?

Dr. Dwinelle—I cannot speak from a very large experience on this subject; mine has been very limited; but I was intimately associated with Dr. Younger in the early part of his career here, and took great interest in his operations. I had great incredulity that such operations could be successfully performed, because it is really contrary to our prior knowledge of anatomy and physiology and the healing art; nevertheless, if a person can prove that he has jumped over the moon we are bound to believe it.

I want to sound a word of caution for the benefit of our ship of state in regard to the anæsthetic part of this subject, with particular reference to cocaine. The use of this drug up to this date is entirely experimental. We know that there are individual idioysnerasies of constitution, and that an article which one person may take with impunity would be exceedingly deleterious, if not fatal, to another. You know that some people who are in the habit

of taking morphine or opium can take enough of this drug to kill half a dozen other men. These idiocyncrasies are peculiar to the individual. I have had some experience with cocaine, and also with its parent, cocoa leaves, and I take great interest in it. I have seen several instances of the administration of cocaine where there was some doubt about the recovery of the patient from its effects. So I merely rise to sound a word of alarm, and to issue a caveat to our profession at large to be more cautious in the administration of this drug. I think the best possible safeguard in the use of cocaine is to fix a limit to the quantity administered, and not to exceed that limit. I was especially delighted with the operation of Dr. Kirk here, when I found that he put a limit upon the quantity of cocaine, \frac{1}{2} grain, used. We should all do that, especially as we know so little about this agent. He passed the point of the hypodermic syringe up between the periosteum and the alveolar process externally, on the labial surface, about half an inch, introduced his eighth of a grain and let it remain for five minutes or a little longer before he commenced the operation, which was then comparitively painless. I have seen dentists use cocaine ad libitum in operating: they were continually injecting it from the beginning to the end of the operation. It seems to me that discretion would be the better part of valor, for I have seen instances where a patient has manifested very serious and alarming symptoms.

Dr. Kirk-Mr. President, I will speak a word on the subject of cocaine. I have always pursued the plan of using a definite quantity of cocaine, because frequently we get too profound an effect from it. I have been led to the use of one-eighth grain doses as a fair average; and from my study of the subject, I think its physiological action has been pretty well settled. I think perhaps one of the best investigations that has been made upon the subject was made by Dr. Hugenschmidt, of Paris, an associate of Dr. Thomas Evans. I have had the opportunity of looking over his work. He has made a quite extended investigation of its physiological action, and has used it largely for the purpose of extracting and in the minor surgery of the mouth, and he has said distinetly that its action is that of a vaso-motor constrictor. Knowing this to be its action, the antidote that suggests itself is nitrate of amyl, which acts in an entirely opposite direction. I have had one or two instances of somewhat marked systemic disturbance from the use of cocaine, and have counteracted it by the use of nitrate of amyl. It is one of the most potent remedies against syncope or heart failure, and controls the influence of cocaine at

once. The effect of the nitrate of amyl upon the heart is to stimulate its action. Hypodermic injections of ether, or the exhibition of ether by the stomach; hot brandy punches, or hypodermic injections of ammonia, or the exhibition of aromatic spirits of ammonia by the stomach, may be resorted to as means for controlling the effect of an overdose of cocaine. A heart stimulant is what is needed. While some fatal cases have been reported, it is to be noted that as much as one grain of cocaine has been given hypodermically without fatal results. We should know the limitations of a drug in order to use it intelligently.

Dr. Cornwall—With regard to what has been said about waiting five or six minutes for the cocaine to have its effect; I witnessed a clinic given by Dr. Perine, in which he commenced to operate immediately after the administration of the cocaine, he claiming that the effect was instantaneous.

Dr. Dwinelle—It is not instantaneous.

Dr. Cornwall—There has been some curiosity expressed by those who witnessed the operation in my case as to the amount of pain endured. I believe most of those who saw the operation know that there was no cocaine administered; but this morning my attention was called to an article in one of the local papers, which stated that I was enabled to bear the pain through the application of Christian Science However that may be, I am not prepared to state positively that that helped me or that it did not. I have never had any experience before this with the Mind Cure or Christian Science. But I am not prejudiced against it, and I don't know anything in relation to it to make me very highly in favor of it. In fact I do not know of any way to settle that point, as to whether it was of any benefit to me or not in the operation other than having some teeth put in without the aid of Christian Science and without cocaine. I have a space left that is not yet filled, and if Dr. Kirk thinks it justifiable I am willing to try it. I am ready to give this a fair test, and I do it quite as much for my own satisaction as for any other purpose.

Dr. Sudduth—Is there any soreness to-day around the implanted tooth?

Dr. Cornwall—There is no soreness. It is very quiet.

Dr. Wheeler—What was the difference between this process and the cutting of sensitive dentine?

Dr. Cornwall—I think cutting the sensitive dentine is more sharply felt than cutting a socket in the bone.

Dr. Kirk-The experience of Dr. Cornwall as to the amount of

pain he suffered differs not at all from that of the patients for whom I have operated without any anæsthetic. It is not a painful operation by any means. I am sorry that this question of Christian Science has been brought in, in this connection. I am pleased that Dr. Cornwall has expressed his views upon the subject and I will state for myself that there is joy amongst one dentist in this convention over one sinner that has repented.

Dr. Smith—There is one thing in which I differ from some others: that is in being careful to have the tooth fastened in thoroughly so that there is no chance of displacing it. The tooth which I first saw implanted by Dr. Younger, in Rochester, was a bicuspid, and the fellow went to a political meeting three or four days afterwards and got it knocked out. It was tied in with a little thread. The manner in which I fasten these teeth in is this: if there is no cavity in the tooth I cut one, and also cut one in the adjoining tooth, and put in a small staple running from one to the other, cementing it in, which holds the implanted tooth securely. It is left for two or three months until the tooth becomes firm.

Dr. Curtis—I think, like Dr. Kirk, that it is unfortunate that Christian Science has been mixed up with us here, and to have it go out to the world that we tolerated and gave some sort of endorsment, to Christian Science. I believe Christian Science is an imposition, and I do not think there is a man in this room who believes that it is anything more than an old woman's whim.

I read my paper here under protest. I got it up in a few hours, doing the best I could in that time. I am glad to have seen the operations yesterday, and I hope there are many more converts to implantation. As Dr. Sudduth says, unless we study the subject, and select our cases with great care, we will have failures and may have to suffer if brought before the law if we are not thoroughly posted in the matter.

As to cocaine, I believe we can very readily get a toxic effect with it. I have in a number of cases seen it in my patients. One was the case of my brother, a physician, who studied the physiological action of the cocaine. In two and a half minutes he lost his suffering. It made him sick at the stomach. He said that a minute after the injection he was stimulated to the extreme, and in three or four minutes after he was relieved. I injected it directly into a bloodvessel. I have not seen any really bad effects from the use of it. I never give it except where the patient demands it. I think a person is better qualified to stand pain without the drug than with it, and in most cases I do not use it at all.

The paper was passed.

DENTAL HISTORY, No. 6.

BY J. HAYHURST.

We give simply an abstract of the paper, which was a most excellent one, but which dealt largely in personal history, that would not be of interest to the general reader; said the essayist:

"I purpose on the present occasion to treat of the manufacture and preparation of the material of which teeth are made, and of some of the most important manipulations necessary in their adaptation to human wants; and I shall exhibit some specimens of old time work, as well as show some of the material in the process of preparation.

"In speaking of the manufacture of teeth it will not be necessary to give more than simply a passing reference to those which were made out of ivory, sea-horse or shin-bone, etc., which were in use in my earliest recollection, and were worn by different persons with a questionable degree of comfort.

"It was when the porcelain tooth became a factor in this matter that their adaptation both as to use, comfort, convenience, appearance and cleanliness of the artificial dentine became a possibility.

"The first porcelain teeth that I remember to have seen were single teeth without gums, and had a very close resemblance to split beans, what is known as the "poor man's variety." I think they were made by Samuel Stockton, who had a dental furnishing store on Vine street, afterward moved to Chestnut street, Philadelphia. They were intended to be set on a silver or gold plate, and answered a good purpose.

"It is not my purpose to follow up the train of private enterprise by naming the various firms and corporations, who make for us at this time, and at inexorbitant prices, so close a resemblance to the natural organs, that it sometimes makes it extremely difficult to determine which is the false and which is the real, even by experts in the dental profession.

"I wish, however, to carry you back to about the year 1846. When I entered the office, or rather the laboratory of my old preceptor, John Anderson, who for a consideration promised to teach me the art and mystery of dentistry. Plate-work was at that time the only work in demand. And let me here in passing say that I have never 'since seen sets of teeth to excel some of those which came from that blacksmith-shop-like establishment. The teeth, when I first went there, were carved in Philadelphia by Dr. Daniel Neal, and were strictly the product of the knife. They were attached to

the plate by long pins reaching nearly from the cutting edges of the tooth through the plate just over the alveolar ridge, and then riveted.

"The body of which those teeth were composed would not stand the heat necessary for soldering, But for hardness in resisting mechanical abrasion I do not believe they have ever been surpassed. The composition and preparation of that tooth body will be given hereafter.

"The public demand seemed to be for carved block teeth on gold or silver plate, and to furnish these it became necessary that the practicing dentist must extend his powers into the region of art, and learn to be a carver.

"It is not my purpose to weary you by giving the various formulæ used by different workmen in the manufacture of porcelain teeth. But I purpose to give the composition, ingredients and proportion of Dr. Daniel Neal's tooth body, because it made such an impression upon me in its preparation and I shall never forget the weary hours I spent over it in reducing it to the proper consistency. It was composed of spar, 6 ounces; quartz, 3 ounces; kaolin, 1 ounce; titanum, to color. These various substances were to be reduced to so fine a powder that no grit could be perceived.

"These articles were placed in a large 13-inch wedge-wood mortar, with a long-handled pestle, loaded with lead, and after a day or two was spent in thus going round and round, and when the contents of the mortar began to stick to its sides, enough water was poured into the vessel to make the material about the consistency of cream. This mass again employed all one's leisure time for about a week, when it would be fit for use. All tooth body contained the same ingredients; the only difference was in the relative proportion, and difference in preparation.

"Next came the enamel; the various colors necessary were obtained by certain manipulation of the metals—gold, silver, platinum and titanum. The gum enamel was made of gold by a complicated process, and one that often resulted in failure. The process by which the best gum color was produced, if I am rightly informed, was invented by Dr. Elias Wildman, of Philadelphia.

"But these things have all passed away, and as the march of improvement opens up to the true devotee the door through which he may walk to greater and higher attainments, so will the past become more and more dim, until it recedes from view. So that to learn the lesson which it teaches, some fitting instrument must be found to bring them to light, and place them in such array as to meet the necessities of the age and times.

"The younger portion of our profession can have no idea of the troublesome path along which the older ones have walked, and even this sketch, crude as it is, may lead to a comparison of the olden time when the dental practitioner was often thrown on his own resources, up to this time when every convenience and contrivance can be found at hand in some of the many well-furnished dental depots.

"In view of the many improvements, more and better work ought to be done in a given time, with increased comfort both to the operator and the patient."

DISCUSSION.

Dr. Stockton—I only wish to say that I doubt very much whether the present mode of making and inserting artificial dentures is any improvement upon the old. We have not improved upon the gold and silver plates made at that time, which were clean and nice and lasted for many years, with the 'mouth in as healthy a state, even when the patient lived to be thirty or forty years older, as when the plates were put in.

Dr. James Truman—It is not a matter for discussion, but the paper interested me exceedingly. It carried me back to my boyhood, to a period antedating somewhat Dr. Hayhurst's professional life. I think that he is perhaps mistaken in stating that Dr. Stockton's teeth were of a bean like character. As I remember them, and as a boy I used to frequent Dr. Stockton's rooms, they were very excellent teeth. On one occasion, in conversation with my colleague, Dr. Wildman, he gave it as his opimion that no modern teeth excelled those made by Dr. Stockton, either as to shape or quality. It seems to me proper, as Stockton was really the first person who made teeth, that we could call teeth, that I should state the fact.

The question has been asked as to who invented the mode of moulding teeth referred to. I think the credit of it belongs to Dr. Calvert, now of San Francisco. I remember that he had a particular mode of making them which was introduced at the Pennsylvania College of Surgeons and he was given a gold medal for it. I know of no other manufacturer previous to him.

Dr. Fowler—I think I can endorse what Dr. Truman has said in relation to Dr. Stockton's teeth. Before the firm of McCarthy & Jones was formed, Dr. Stockton made splendid teeth; not gum, but plain teeth. Dr. Locke, of New York, then went into the making of block teeth. They were clumsy and brittle affairs, and their unsatisfactory character drove me into making teeth. I have to

differ with the essayist on some points. If you want translucent teeth, you don't want much kaolin or quartz in their composition, but principally spar. I am surprised to see this piece of feldspar of Dr. Hayhurst's that is fused down. The test of feldspar is to take a piece of crude spar and run it in a muffler and give it a white heat. Then we grind it to a fine powder and put that in the muffler and test it. If the spar keeps its form we do not want any quartz added. I could have produced specimens of teeth made of this compound; eighteen parts of spar, two of silex and one of kaolin. That will make splendid translucent teeth.

Dr. Atkinson—This is a very interesting subject, and the great lesson to be learned from it morally is the wonderful patience that the older men exercised in the prosecution of the art. There is scaracely anybody who understands the chemistry of ceramic work, outside a few recipes that are held by workmen in ceramic establishments. What is kaolin? It is feldspar minus potash. It is purged in Nature's laboratory and we call it kaolin. What is silex? It is oxide of silicon pure and simple.

History is history; we had better not put anything on record as the final truth about this until more has been promulgated. From 1834, 1835, and 1836, Kingsbury & Andrew were making very fine translucent teeth in the City of New York.

With regard to the shape of the teeth, the bean-shaped tooth referred to was a French tooth. The first that I saw of that kind were covered with blisters on the surface, which answered the purpose of making them semi-transparent, while the large amount of kaolin in the body of the tooth made it opaque. They never looked transparent enough to show the light through them.

My first teeth were made from a boulder that was transported into Loraine county, Ohio, during the Glacial Epoch, if we are to depend upon the geological record; and I borrowed from a blacksmith, a sledge and hammered it to pieces until I got a back-load, which I took home and put some of it into the fire where they were making cast-iron; I placed it in the edge of their furnace and kept it there until it was heated white, then took it out and quenched it and picked out the spar. That is the only way we could distinguish whether we had feldspar or silex. And the coloring matter in that day was what was called rose red. I do not know that that is known to-day generally. Only a few manufactured it. So far as the moulds used are concerned, a man by the name of Foster, a very brilliant and drunken fellow who went over the country making artificial teeth, showed us that method. That was about 1845.

Dr. Hayhurst—I do not claim to be the inventor; but I do claim to have been a co-laborer of Dr. Calvert. I was in his office, and we both worked at this thing at the same time. He was the leader, and of course got, as probably of right belonged to him, the credit of the invention. That, I think, ought to go with the remarks of Dr. Truman.

I don't wish to be understood as saying that the teeth made by Dr. Stockton were not good teeth. I say that the first teeth that I saw resembled a split bean in appearance. I do not know whether Dr. Stockton was the maker of them or not. My attention was called to Dr. Stockton's place and business long before I had any idea of being a dentist.

Dr. Fowler—Speaking of Wildman's color, Wildman's receipt was a receipt for block work, by which they took extreme heat to put in his rose red or continuous gum; and it will make the best gum now.

Dr. Dwinelle—I want to say to some of the younger members that if they would look over the records of the past and commune with some of the older members of the profession they would be surprised to find how many new things there are in those old, very old records.

With regard to Dr. Stockton's teeth, I have now in my possession some of his very earliest productions. If he made bean shaped teeth before these which I refer to I am not aware of it; but I have some of Stockton's earliest teeth that are beyond anything that we have at the present day in all of the qualities that are desirable in artificial teeth. They resemble Ash's teeth in many respects. The crystals are small and they are dense to a large degree. They resemble the Ash teeth in their creamy appearance, compactness and smoothness; but they had the quality of enduring more heat with greater impunity. The effort seemingly has been among all who have been engaged in imitating the natural teeth to avoid two extremes: first, the extreme of tenderness, delicacy and friability that is connected with teeth made exclusively of feldspar. The other extreme is the French bean tooth, which was made almost exclusively of kaolin, which, as we all know, is a species of fire clay. The golden mean lies between these extremes. Kaolin gives opacity, with great strength and capability of enduring heat; feldspar gives delicacy and friability. Stockton combined these qualities to a great degree. I found that he derived some very excellent hints from the Chinese in reference to preparing his body. It is well known that the Chinese, during their entire lifetime, continually work at mixing over the body for their chinaware. It is made of feldspar, which is silex with its natural flux combined with it. Silex is non-fusible unless fluxed with kaolin. The Chinese mix it over and over during whole lifetimes, and in many instances having previously inherited the same material from their fathers. It descends from father to son as an heirloom. Stockton had a very fine quality of feldspar, and he carried that process of mixing and grinding to a very high degree. There was a great deal of grinding and mixing, and it was left in buckets under water. The more feldspar, the more translucency and friability; the more kaolin and silex the tougher the product, with superior qualities for enduring heat. That has been the struggle from time immemorial, and will be to the end. We are aware that some teeth made not more than a thousand miles away are deficient in the quality of compactness; their crystals are coarse. The manufacturers of these teeth could get a good many important lessons from the early teeth workers, makers and carvers.

The paper was passed.

CLINICS AND EXHIBITS OF THE NEW JERSEY STATE SOCIETY MEETING HELD AT ASBURY PARK, JULY, 1888.

- Dr. E. C. Kirk, Phila., successfully implanted a superior central incisor for Dr. Cornwall, without the use of cocaine.
- Dr. T. S. Waters, of Baltimore, built up with gold a superior first bicuspid, the palatine and anterior proximal sides of which were destroyed by decay. The electric mallet was used with six dry battery cells.
- Dr. Charles F. Wheeler, of Albany, N. Y., exhibited his method of using gold with platinum and iridium, building up a right lateral and facing the cutting edges with the above-mentioned metals. He also built up a second lower molar completely broken down to the margin of the gums, and faced the entire grinding surface with the same metal.
- Dr. William B. Finney, of Baltimore, filled with gold a right superior first bicuspid, the distal surface and crown gone. The tooth was filled from the apex with the electric mallet, using a Detroit dental motor, consuming nearly three hours time and one-eighth ounce of foil.
- Dr. C. A. Timme, of Hoboken, N. J., exhibited partial cases of pure gold deposited on the east by electricity the thickness of twenty-four gauge plate. The plates are quite stiff, and can be soldered if necessary. The lower plates are stiffened by a gold

wire soldered on the lingual surface. They are made for the profession by Durand & Co., of Newark, N. J.

Dr. S. C. G. Watkins, of Montclair, exhibited new shapes of amalgam instruments.

Dr. G. L. Curtis, of Syracuse, implanted a second inferior molar for Dr. L. N. Seymour of Asbury Park. While the operation was necessarily difficult, owing to the location and the recession of the aveolar walls, it was eminently successful. The patient being extremely sensitive, a twenty-five per cent. solution of cocaine was employed locally with good results. The operation occupied about thirty minutes. The tooth was secured to the third molar by means of a palatinum wire staple to prevent movement of the ingrafted organ until union was complete. The tooth was examined two days later and was doing well, the patient having suffered no special inconvenience.

EXHIBITS.

The S. S. White Dental Manufacturing Company had on exhibition dental chairs, electric motor, dental engine, revolving fans, oxygen inhaler, new implantation instruments, crown instruments, matrices, and a full line of dental instruments generally.

Gideon Sibley, of Philadelphia, porcelain teeth, dentifrices, Sibley's gold foil, dental instruments, etc.

Seabury & Johnson, of New York, antiseptic cotton, hydronapthol, lints, and disinfectants.

A. W. See & Co., of New York, gold foils, amalgams, dental engines, operating chair, etc.

Dr. Ivory, of Philadelphia, rubber damp clamp.

Mr. Green, of Camden, instruments and dental engine clamps.

The Florence Manufacturing Company, of New York, tooth brushes.

Welch & Co., of Philadelphia, porcelain teeth, dental equipments, etc.

Ward's Electro Metallic Dental Plate was exhibited by the inventor and Dr. E. E. Clarke, of Newark. Gold is deposited on a silver plate for use in artificial dentures.

COMMITTEE REPORTS.

On motion of Dr. Watkins, a vote of thanks was tendered to all the gentlemen who had read papers at the meeting or operated in the clinics. On motion of Dr. Levy, a special vote of thanks to Dr. J. L. Smith for kindly lending his magic lantern, and giving his services in its use.

A special committee of three, consisting of Drs. Levy, Brown and Meeker were appointed to wait upon the proprietor of the West End Hotel and tender the thanks of the Association for kind attentions to the Society.

The Committee appointed on the President's Address would most respectfully recommend the adoption of the following Preamble and Resolutions:

Whereas, It has pleased the All-wise Ruler of the Universe, in His inscrutable wisdom, to remove from our midst our late member and companion, John W. Scarborough, while in the very vigor of his manhood and zenith of his usefulness—a man of honesty, integrity, and conscientiousness in the performance of his duty as a professional man, and citizen, and true to all the obligations of life, both morally and socially—

Resolved, That while we bow to the decree of the Most High, we will place on record our appreciation of his services as a member of our Society, and acknowledge his faithfulness in his attendance on its many meetings, and his promptness in fulfilling the duties imposed upon him.

Resolved, That a copy of this Preamble and Resolutions be recorded in the minutes of our Society.

They would also recommend, that in case of death occurring to any of our members, that the Chairman of the Executive Commit, tee, on being notified of the fact, shall appoint a committee to attend the funeral of the deceased member, and report at the next meeting of the Society.

[Signed.]

FRED A. LEVY,
J. HAYHURST,
S. C. G. WATKINS,

Adjourned, sine die.

Editorial.

OUR IMPERFECT CULTURE.

It is a well-known fact that the Americans are essentially a practical people, a people who are accustomed to look at the utilitarian aspect of a question, rather than at its purely intellectual phases. Thus it happens that their inventions usually show the greatest ingenuity; and in the application of labor-saving machinery, which are marked by both speed and excellence, they lead the world. The same can be said even of the learned professions. The skill of American surgeons is known and appreciated the world over. This does not apply to surgery alone, but to the American dentist, also, for the excellence of American dental operations is proverbial. So much so, that many have used the title "American Dentist" with the view of increasing their patronage and thereby their incomes.

The medical course in Europe is longer than it is in this country, yet we find that the American graduate is not only fully equal in skill and the practical application of the principles of medicine, but that, in even competition is usually more successful in winning practise than his European rival.

We noticed a short time since an article from the pen of a distinguished professor in an Italian school of medicine, in which he remarked, that when he came over here to examine our schools he was at first prejudiced against them on account of their short courses, vet, that after a careful study of the methods of teaching prevalent here, and of the aptness of the students, he had come to the conclusion that the average American student could learn as much in three years, caeteris paribus, as the Italian could in four. But despite of the fact that the American mind and the American genius are not a whit less than those of any other country, yet it undoubtedly remains true, that the palm for accurate and exhaustive physiological and pathological research does not rest with us. And why not? We find the explanation partly in that peculiar spirit innate in an American, which urges him to do in haste that which he is able to perform. Everything is done apparently with the intention of economizing time; eating, drinking, travelling, all the work of both the artisan and professional man are done under high pressure; even our pleasures are taken with a rush. Such habits and surroundings are utterly inimical to the slow and plodding processes of methodical research. Where in all America could we find a man like one wellknown German, who spent a lifetime in studying the Latin cases, and then regretted on his death-bed that he had not confined his attention entirely to the Dative case; or, like another, pass his days in unravelling the intricacies of the second Aorist tense? Our nervous characteristics are mainly due to our surroundings, and to our rapid growth as a nation, so that we are much like the precocious child at school—having an ability ahead of our years, but not the physical qualities necessary to make proper use of that ability.

Although the reason for our deficient culture, to a certain extent, lies in what has just been said, the main reason we think, can be ascribed to a lack of the facilities and endowments which, the institutions in other countries equal in the scale of civilization and culture with ours, have. Other countries have their huge piles of buildings, universities, which are made comfortably secure from financial embarrassments either through government aid or private endowments, and about which are gathered galaxies of the most ambitious young men of that particular country. And should one of these men distinguish himself in his peculiar branch, he will receive an appointment which secures a living, and throughout the remainder of his life he may, if he choose, devote himself to studying the growth of a hair or the development of a tooth, secure from the trials that beset a man who must from day to day, earn his own livelihood. And is such a life of no benefit? It certainly is, for these are the men who are quoted the world over, who mould the opinion of the educated world, and whose work is most likely to go down the ages.

If a man can, at this advanced stage of civilization, give to the world one new idea, or make one useful discovery or invention, he has been of value not only to his fellowmen, but to countless succeeding generations, and his life has been well spent. Not all persons, however, care to pass their lives in the plodding quietness of scientific research; but there are some who do, and for these there ought to be provided suitable means.

Now, these accurate investigations are not remunerative from a pecuniary point of view, yet they are essential, and he who makes them must live. And, further, the apparatus and the materials necessary for making many of these investigations are so costly, that few private individuals are able to purchase them, unaided; and it is well known that the wealthiest men are not generally those who are willing to devote their lives to an occupation which entails so much hard work and gives promise of so little return. There are only two ways by which Americans can gain a prestige

in accurate scientific investigation equal to that which they already possess in the practical application of the knowledge gained by such investigations in other countries, and those ways are either through a system of government bureaux created for special investigation or through private endowment.

For our own part we think that our government would do well to imitate the example of most of the other civilized countries, by creating positions for those who have shown by their work that they should have full time and means to pursue such inquiries as will redound to the benefit of mankind. But many think such a course at variance with the genius of our institutions; and, whether it is or not, we do not have a system of government pensions, and must therefore depend on the only other means left—that of private benefactions.

OUR INSTITUTIONS.

It is greatly to the credit of our wealthy men that we have many noble institutions of learning, the result of their generous gifts. Among these may be mentioned Harvard, Yale, Princeton, Johns Hopkins, the University of Pennsylvania, and many other institutions which are gathering about them the most distinguished men of letters and science. Johns Hopkins University is to be particularly commended, for it is the first institution of our country to adopt the experimental scientific methods of European institutions. From the good work done in the past, and from the assemblage of learned men now gathered within its walls, we may expect great advancement in the future. This is an instance of a school that is heavily endowed, and can afford to pay first-class salaries to first-class men.

The College of Physicians and Surgeons of New York received a fine gift from the Vanderbuilt estate, and with this they have erected the finest laboratories in the world. But this large sum will not last forever, and the College of Physicians and Surgeons even now needs the interest on another million to pay salaries to the men who should work in those laboratories. The present tendency is toward the better endowment of our institutions as witnessed by the recent founding of the Leland Stanford, Jr., University of California, which has received a gift of astonishing magnificence—aggregating 15 millions of dollars well invested—the income of which is to be devoted to the upbuilding of a University second to none other in the world. As the prospectus says "the brief history of California, as an American state, comprises much that is noble and great, but nothing in that history will compare in grandeur with

this act of one of her leading citizens. The records of history may be searched in vain for a parallel to this gift of Senator Stanford's to the state of his adoption. The utter absence of ostentation and the singleness of purpose which have characterized this gift of many millions, render the act unique in the records of public benefactions. Many wealthy persons have in the evening of their days * * * or by will after death bestowed large portions of their wealth for the public benefit; but in this case the donor is a man hardly past the prime of life, in robust health and in the full strength of unimpaired faculties * * * yet he freely gives a large part of his more than princely wealth to advance the cause of education, and afford the sens and daughters of California ample opportunity for obtaining the highest and broadest culture."

This university can truly be called great; for surely the title will be deserved by a pile of buildings which are to be erected as a noble memorial to the only son and child of Senator Stanford, Leland Stanford, Junior, now deceased. Senator Stanford has devoted much time and thought to the elaboration of this project, having first secured an act of legislature with regard to endowments for educational institutions, and he intends that this school shall in time be equal to, and if possible excel, all the other best colleges of the world. We say, "in time," for Senator Stanford very wisely does not desire that the money shall at once be consumed in the erection of great piles of buildings, out of proportion to both the number and the wants of the students; but he intends that his undertaking shall be a normal growth. The act of endowment requires that within two years the trustees shall adopt a general plan for the university buildings, and that "such buildings shall be plain and substantial in character, and extensive enough to provide accommodations for the university and the col. leges, schools, seminaries, mechanical instituties, laboratories, conservatories and galleries of art part thereof." It is further stipulated that the buildings shall be built only as fast as they are needed, and not faster, the Senator sensibly adding that extensive and costly buildings do not necessarily make a university; but that it depends for its success rather on the character and attainments of its faculty. With regard to the faculty, the founder intends that it shall be the best attainable, and to that end has provided that higher salaries shall be paid in this university than in any other similar institution in the world. Here are to be erected schools of medicine, dentistry, law, mechanics, indeed of every known branch of learning; and the result of these exceptional salaries, coupled with the other advantages afforded, will be to collect about each of these schools the most learned men of that particular branch. When we add to the inducement of salary the fact that California probably has the most equable and pleasant climate of the civilized world, and that here the student and the scientist will be separated from the hurly burly of the social and the business world, both so inimical to close application, we have all the factors that tend towards the solving of the more recondite mysteries, and the steadily pursuing of the more untrodden paths of science. So we earnestly hope that part of this great sum will be devoted to the erection of such laboratories, and with such apparatus, that the most eminent and studious men may there pass their lives in physiological and biological research, fields of extraordinary interest, and the results of which are of vital importance to every human being.

The trustees of the University are to concern themselves mainly with the financial affairs pertaining thereto, while the president of the school is to have the exceptional powers of "prescribing the duties of the professors and the teachers; of removing professors and teachers at will; and of prescribing a course of study and the manner of teaching;" Senator Stanford's idea being that the president should be responsible to the trustees for the educational management of the institution, and to make him absolute, with the other members of the faculty as his staff, believing that power and responsibility go together. A number of free scholarships are to he given either to those who merit them by their conduct and study, or to the deserving children of those who, dying without means in the service of the State or in the cause of humanity, have a special claim on the good will of mankind. Thus these scholarships will not be given as charities, but as benefits both deserved and earned. Post-graduate courses of lectures are to be delivered by the ablest professors on the various subjects of advanced learning, and these lectures are to be free not only to the graduates of the University, but also to the graduates of other schools. One of the stipulations, and a good one, is that the doors be open to both male and female alike, since the donor considers it of the first "importance that education be full and equal, and varied only as nature dictates."

In short, Senator Stanford intends that this shall be a fount of learning that shall satisfy the cravings for knowledge of the humblest mechanic to the most finished scholar or scientist. This great institution, if continued on as broad a base as its founder

evidently contemplates, must in the future surely give forth much that is valuable to mankind, and we shall, with great interest, observe its progress.

ONE OF US.

Dr. C. E. Kells' compact arrangement of electrical appliances for office use, including an automatic reel, a tiny incandescent lamp, and other apparatus of his own invention, attracted much attention at the joint meeting at Louisville last summer. ingenious application of electricity in a series of experiments for testing the conductivity of various filling materials will also be remembered by all who where in attendance at that meeting. It is with pleasure that we note that he has extended the application of the thermostat to a larger and more practical field, in an automatic fire alarm, which has received the indorsement of Prof. Eliha Thompson, and has been indorsed by the boards of underwriters of nine cities; New Orleans allowing a rebate of ten per cent. on all buildings where it is used. It has also been adopted in New York, Cincinnati and Buffalo, and is considered the most reliable system vet invented, as there is no possibility of false alarms, while the ground connection prevents interference by the breakage of overhead wires. The thermostat in his fire alarm is about the size of a watch dial, with the same concave metallic disk and adjustable screw used in the experiments above referred to. The screw is set to operate the transmitting-box at any desired temperature, the thermostat turning in an alarm when that limit is reached. The indicator in the central office shows the street, the number of the building and the story from which the alarm comes. In New Orleans the system is under control of a company officered by the most substantial business men of that city. and of which Dr. Kells is treasurer.

THANKS.

We desire to acknowledge our indebtedness to Dr. W. D. Miller, Berlin, for his earnest efforts in behalf of the journal, and his most efficient aid in securing the corps of foreign correspondents. Without his kindly assistance, we do not see how we should have succeeded in organizing our foreign staff as well as we have. The amount of labor necessary to set in motion and get to running smoothly an enterprise of the magnitude of the International Dental Journal is only to be appreciated by those who have gone through with it.

Mankind is not altogether sordid and selfish, notwithstanding such is the impression obtained from contact with the business world in general. The above reflection was called forth by an unasked favor that was granted the International Dental Journal Company by the Welch Dental Manuf'g Co. by allowing us the use of their mailing list, in sending out our twenty thousand circular letters to the profession, we take great pleasure in publicly acknowledging their generosity. There is probably no larger or more accurate mailing list extant at the present time than theirs. It costs a great amount of labor and money to keep a corrected mailing list of the dentists in this and foreign countries, and this enterprising house has spared no pains to be up to the mark in this direction. Knowing the full value of printer's ink they have kept themselves well before the profession.

We are in receipt of a neat little appointment book published by R. I. Pearson & Co., also a kindly letter asking for a bill for the copies of the International sent, as we supposed, in exchange for copies of the Western Dental Journal published by that firm. Their letter shows such a broad and praise-worthy spirit that we take the liberty of publishing it.

KANSAS CITY, Dec. 31st, 1888.

DR. W. X. SUDDUTH,

Dear Sir.—Please send International Dental Journal for 1889, as follows, * * * * * and bill to us. Your Journal being largely dependent upon the profession for support, we have not heretofore asked it sent to the Editors of the Western Dental Journal as complimentary or in exchange; but have always paid Dr. Barrett for the copies, and we prefer to continue to do so Upon receipt of bill we will remit as usual, and may by that time have additional names.

(Signed), Yours truly, R. I. PEARSON & Co.

Favors of like character, and the congratulatory and commen datory letters that we are continually receiving from the leading dealers and manufacturers of dental supplies, are the very best evidence that the International is appreciated by the business portion of the dental world. Our very rapidly increasing subscription list also gives positive evidence of its appreciation by the profession. So we say thanks to the dealers—thanks to the manufacturers—thanks to the profession, thanks all 'round.

SPECIAL OFFER FOR STUDENTS.

It is intended to make the journal the special medium for students. In its advertising columns will be found the largest variety of goods manufactured in this country. Its pages do not advertise the product of one house only, but give place to the leading specialties manufactured by the leading houses, thus affording an opportunity of making a selection. Every manufacturer has some leading article that he makes better than any other house, because of special advantages for manufacturing, etc.; and by consulting our advertising pages the student can find out where to purchase such articles to the best advantage.

The same is true regarding bargains. Every now and then certain houses desire to hold out inducements to students to purchase goods from them, and consequently offer some special line of goods at very low prices. The student surely cannot afford to let such opportunities pass, and the place to find such bargains is in our advertising columns.

Those students who desire to subscribe for the International can do so by sending two dollars for the remainder of the year. Those who desire Stowell's Atlas can have it also by enclosing \$3.50. If it is desired to have it sent by mail, twenty-five cents additional must be included; otherwise it will be sent by express, at the expense of the subscriber.

Subscribe for the International, the organ of the profession, and you will not regret it.

BIBLIOGRAPHY.

We desire to acknowledge the receipt of two reprints from Dr. George Cunningham: A Professional Holiday, being an account of his visit to America last year and his impressions of American dentists as he saw them in the Ninth Medical Congress and his paper on the Treatment of Pulpless and Abscessed Teeth. The Dr. is an able and concise writer, and in his "Holiday" notes has also shown himself a versatile writer.

An elaborate work upon the status of dentistry in America by
Dr. Kuhn is also at hand. It is in the form of a report to the
Board of Public Instruction in Paris, and treats of our colleges,
our State laws, and our societies. In a supplement the author also
considers the institutions of England, her colonies and the Continent. The book is fully illustrated with cuts of our colleges and
is, so far as we are aware, the first and only effort that has been

made to compile statistics in regard to our dental institutions. The Board should feel thankful that they secured the services of so able and indefatigable a worker as Dr. Kuhn.

CLINICAL LECTURE ON CERTAIN DISEASES OF THE NERVOUS SYSTEM. By J. M. Charcot, M.D. Translated by E. P. Hurd, M.D.

Prof. Charcot is perhaps one of the most voluminous writers in the medical profession, having published up to the present time upwards of two hundred brochures, memoirs, and books. As a thinker and original writer he is well known. His investigations have always been far-reaching, and the subjects of interest. As an histologist and pathologist he has ranked high for the past fifty years. His work on the spinal cord, in which he differentiated the nervous from the connective tissue elements, was unrivaled at the time. His subsequent labors on sclerosis alone are sufficient to perpetuate his name as an original investigator. The present volume should be in the hands of every dentist, treating as it does of psychological as well as nervous disorders, both of which come under our notice in practice, and about which we should know more.

We desire to call attention to another book of similar character by J. Leonard Corning, which treats of hysteria and epilepsy. The subject of hysteria in women and children is particularly well handled, and is a subject about which dentists can not know too much.

These books belong to the Physicians' Leisure Library Series, a third of which is also at hand, treating of abdominal surgery, by H. C. Wyman, M.D. The series is published by George S. Davis, Detroit, Michigan. \$2.50 per annum, issued monthly; 25 cents single copies. Cloth, 50 cents.

Photographic Illustrations of Skin Diseases. By George Henry Fox, A.M., M.D. New York. E. B. Treat, Publisher, 771 Broadway.

Parts seven and eight of this magnificent work have been received, and are quite equal in interest to any that have preceded them. We cannot well say more in their favor to any one at all interested in dermatology. The work is of the utmost importance, for each one of the numerous plates gives a clinical lesson which cannot be mistaken.

We have received from Dr. H. W. Harkness a neat sixty-four page pamphlet, descriptive of the Leland Stanford Junior University of California. The book is illustrated with photogravure

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plates of the board of trustees and those intimately connected with the work of founding the institution. This is a novel method of presenting the university before the public, and one that could be adopted to advantage by some of our eastern institutions. If we were more familiar with the faces of the benefactors and advisors of our educational institutions, we would feel a greater interest in their advancement.

OBITUARY.

Dr. J. J. P. Ostrader, a well-known dentist, and prominent and honored citizen of Hot Springs, Ark., died at the residence of his son-in-law, Dr. W. A Thompson, Nov. 21, 1888, at the ripe age of sixty-nine years. The son of a New York farmer of moderate circumstances, he acquired a thorough education by his own exertions, graduating from the Boston Medical College. He was engaged in mercantile and journalistic pursuits for a number of years, in Michigan and Illinois, before he settled down to the practice of dentistry. Having attained prominent position and moderate wealth, he retired from active business some four years ago.

Domestic Correspondence.

To the EDITOR:

In an answer to your letter of inquiry relative to the organization and aims of, as you term it, the "phenominally developed society," will say that the Odontological Society of Pennsylvania was organized January 18, 1879, and the first meeting held Saturday evening, February 1, 1879. No charter.

The aims of the Society are to diffuse the principles of the art and science of dentistry; to develop new modes of practice, and to give encouragement to inventors of useful instruments, or anything in mechanism pertaining to the practice of dentistry, to originators of new modes of manipulation and superior materials for filling. To add to the literature of the profession, by the reading and publication of essays and discussions thereupon, and incidents of practice. To elevate the profession by admitting to membership none but graduates in dentistry or medicine.

The following gentlemen became members at its organization: Drs. Essig, Guilford, Webb, Woodward, Register, Darby, Tees, Huey, Jack, D. Neall, E. H. Neall, Bonwill, Kingsbury, Longnecker and Dixon.

At present we have 87 active members—two of whom are lady practitioners, 2 honorary members and 3 corresponding members; the latter having been active members but are now practising in other states or countries.

Meetings held monthly.

Phila., Pa., Jan. 15, 1889.

Ambler Tres,
Secretary.

Baltimore, Nov. 1st, 1888.*

Dr. Fred A. Levy,

Secy. Nat. Association of Dental Examiners.

Dear Sir: I desire to acknowledge the receipt, this day, of a printed copy of the proceedings of the Seventh Annual Meeting of the Nat. Assoc. of Dental Examiners, and, in return, to send you enclosed circulars of the correspondence between Dr. Waters, Dr. G. F. S. Wright and myself, and also a letter from Dr. W. C. Wardlaw, of the Georgia State Board of Dental Examiners, who with Dr. S. B. Barfield, represented said board at the Louisville meeting of your association. According to Dr. Wardlaw's letter, the list of dental schools were reviewed and re-reviewed two or three times, and finally disposed of, with no objections to the "University of Maryland Dental Department," which as Dr. Wright also states, was "passed without objection or comment of any kind."

In your report of the proceedings (according to the printed pamphlet received to-day), it appears that in the last session of your association, at which there was a very much reduced attendance from the seventeen original representatives, but at which session, the State Board of Georgia was represented, if that of South Carolina was not, the list of dental schools was again revised and, according to the number published in your printed proceedings, the University of Maryland Dental Department was omitted.

Is not such a record of your proceedings strangely incorrect as Dr. G. F. S. Wright, a copy of whose letter I send you, was according to your report, one of the committee appointed to prepare a list of Dental Colleges which your association would recommend to the various State Boards?

Does not Dr. N. C. Wardlaw state that although he was not present at the last session, yet he understood and was "told that nothing had been done but the election of officers and routine business."

Yet your report alleges that the list of colleges was again (not-

^{*} Correspondence sent by Dr. Levy, and which was crowded out of January issue.

withstanding the many previous reviews) "referred back to the committeee to be revised, and was again presented to the association and accepted."

The conclusion I arrived at, from all the testimony given in the letters of Drs. Wright and Wardlaw, who declare that the University of Maryland Dental Department was not omitted from the list of Dental Colleges whose diplomas were to be recommended to the various State Boards (the former gentleman being a member of the committees appointed to prepare the said list of Dental Colleges), are that you have either confounded the proceedings of the second session of your association with those of the third session, unintentionally omitting the name of our department by reason of such mistake, or that advantage was taken of the absence of several of the representatives who were present at the former session, to injure, without any just cause, our institution; for if it is true, which I greatly doubt, that such action was taken at your last session, it could not have been done unanimously at the previous sessions, as the letters of both Dr. Wright and Dr. Wardlaw prove. Respectfully, etc.,

FERDINAND J. S. GORGAS,
Dean of the University of Md., Dental Department.

Orange, N. J., November 5, 1883.

FERDINAND J. S. GORGAS, M.D., D.D.S., Dean, Baltimore, Md.

Dear Sir:—Yours on November 1st, enclosing circulars containing correspondence with Drs. Waters, Wright and Wardlaw received, and in reply I would state:

1st. That I have no record of the attendance of Dr. Wardlaw, and it appears from his own statement that he was not present at the session at which was passed the resolution complained of by you.

2d. Dr. Wright is in error relative to the proceedings of the National Association of Dental Examiners, when he states that your college "passed without objection or comment of any kind." In this important particular: that there was opposition to the insertion of the name of your college among those "whose diplomas to the National Association of Dental Examiners recommended the various State Boards to accept instead of an examination," or it would not have been dropped from the revised list presented by the committee; for particulars of the passage of this resolution I refer you to page 4 of the printed proceedings of the association,

from which it appears that "the list of colleges presented and accepted at the last meeting was re-considered. The list was then referred back to the committee to be revised, and was again presented to the association; was amended and accepted," omitting the name of your college.

3d. That this report of the committee, appointed for that purpose, consisting of Drs. Wright, Rawls and Levy, was signed by each of them, and in that form presented to the association; this original report, omitting the name of your college, and signed by Dr. Wright with the others mentioned, I have in my possession, which you can see upon application.

4th. At the time of the passage of this resolution, as appears upon page 4 of the proceedings mentioned, the roll-call showed ten states represented.

5th. The printed report of the proceedings of the association sent you are correct in every particular, the assertion of Dr. Wardlaw (who was not present), and those of Dr. Wright (who concurred in the resolution dropping your college), to the contrary notwithstanding. As you will see the conclusions which you arrive at, from what you choose to term the testimony in your possession, are totally incorrect, inasmuch as the name of your college was intentionally omitted from the list of the Dental Colleges which the National Association recommended the various State Boards, whose diplomas might be accepted instead of an examination.

There has been no confusion upon my part in the matter; upon the contrary I have been exceedingly particular, and know that there has been no mistake whatever.

Any other or further information you may desire I shall be pleased to furnish you. Very truly yours,

FRED. A. LEVY, Secretary, of the National Association of Dental Examiners.

To the Editor:

Dear Sir:—The letter of Dr. Fred. A. Levy, as well as your comments published in the Jan. No. of your Journal, do injustice to both the publisher and editor of the Am. Journal of Dental Science, so far as relates to an alleged suppression of Dr. Levy's letter to me. The reason it did not appear in the Am. Journal of Dental Science before this time was, that the original copy was sent South to the gentlemen whose veracity it questioned. As a copy of said letter was received from Dr. Levy, it was placed in

the printer's hands, and will appear in the forthcoming number. As the Am. Journal of Dental Science is a monthly publication, Dr. Levy's letter, under the circumstances, could not appear earlier.

Baltimore, Md., Jan. 11, 1889.

F. J. S. Gorgas.

[Our comments on Dr. Levy's letter were made not with the intention of taking sides on the question, but simply to abbreviate the matter sent which it was impossible to get in the January issue.—Ed.]

To the EDITOR:

At the annual meeting of the New England Dental Society held in Boston, November 15th and 16th, the following were elected officers for the ensuing year:

President, Dr. C. A. Brackett, Newport, R. I.; Vice-Presidents, Dr. C. W. Clement, Manchester, N. H.; Dr. W. E. Page, Boston, Mass.; Secretary, Dr. E. O. Kinsman, Cambridge, Mass.; Assistant Secretary, Dr. W. P. Cooke, Boston, Mass.; Treasurer, Dr. G. A. Gerry, Lowell, Mass.; Librarian, Dr. A. H. Gilson, Boston, Mass.; Executive Committee, Dr. A. M. Dudley, Salem, Mass.; Dr. L. Rideout, Lynn, Mass.; Dr. E. B. Davis, Concord, N. H.

EDGAR O. KINSMAN, D.D.S., Secretary.

15 Brattle Sq., Cambridge, Mass.

ST. LOUIS DENTAL SOCIETY.

The annual meeting of this society was held at the office of Dr. A. J. Prosser, 3109 Olive st., Wednesday evening, Jan. 2d, and the following officers were elected for 1889:

President, Dr. A. J. Prosser; Vice-President, Dr. J. Warren Wick; Recording Secretary, Dr. Jessie E. Grasheider; Corresponding Secretary, Dr. William Conrad; Treasurer, Dr. Henry Fisher; Publication Committee, Drs. H. H. Keith, John G. Harper and J. B. Vernon; Committee on Ethics and Elections, Drs. J. B. Newby, William N. Morrison and A. H. Fulley.

There were seventeen meetings held and fourteen papers presented during 1888.

WM. CONRAD,

321 N. Grand Ave.

Corresponding Secretary.

As we go to press the news of the serious illness of Dr. F. Searle, of Springfield, Mass., comes to hand. His illness, though of short duration, is considered fatal.—Ed.

Foreign Correspondence.

To the EDITOR:

Your letter of Oct. 28th received yesterday, and I need hardly say that if I can be of any service as Brazillian correspondent of the International Dental Journal, I will be happy to render any assistance in my power to forward the interests of what is, I trust, already an assured success. With best wishes believe me,

Yours very sincerely,

Sáo Paulo, Brazil, Dec., 1888.

C. R. FLETCHER.

To the Editor:

I beg to acknowledge receipt of your note of the 2d inst., and desire to state that, while expressing some conscious pride in your suggestion, I accept with pleasure the position of foreign correspondent, and will use my best endeavor to further the interests of the journal as it lies in my power so to do.

Jan. 7, 1889.

J. Cowan Woodburn, 197 Bath street, Glasgow, Scotland.

To the Editor:

I beg to acknowledge with thanks the receipt of your letter, and will be glad to accept the post of foreign correspondent to your journal. I think that there is a good field for an international high class journal, which shall be free from the petty personalities that are apt to disfigure American journals.

January 11, 1889.

W. St. G. ELLIOTT,

39 Upper Brook street, London, S. W.

Current News.

Canada is to have a dental journal with Dr. W. Geo. Beers as editor.

Dr. S. A. White thinks a dentist should make every effort possible to preserve the deciduous teeth until nature has thrown them off.

Dr. Carpenter believes that fully 90 per cent. of the diseases of the eye and ear, catarrh, rheumatism and palsy, might be traced to diseases of the teeth and mouth. Dr. Gordon, a physician, of Dalton, Ga., states that an ulcerated tooth may produce conditions resembling cancer, and that neuralgic eye; or earache may be caused by carious teeth.

Dr. R. W. Thornton uses "'Probes and Patience' in the treatment of devitalized teeth, and pumps carbolic acid through a fistulous opening." [Certainly the doctor is standing on a sound foundation when he commences with "patience," and it would be well if all would emulate his method.—Ed.]

Dr. Holland takes the impression of a very difficult case in two pieces, taking the innner portion first. Making grooves in this piece he oils and varnishes it, and then replaces in the mouth and takes the outer portion. Taking them out separately, they are placed together again, out of the mouth, and the cast made as usual.

The Georgia State Dental Soc. in discussing the relative frequency of fatal results under the capital operations of general surgery, and the minor operations of dental surgery, came to the conclusion, that pain being the antidote for effects of anæsthesia, the greater danger in trifling operations is that there is not sufficient pain to counteract the effects of the anæsthetic, and therefore it should not be used in the smaller operations of dental surgery.

WE have been requested to give the formula for Golden's Liquid Beef Tonic that we recommended in our November number, which is as follows:

20 per cent. saccharine matter	20
25 per cent. glutinous or nutritous matter obtained in the condensation	
of the beef	25
25 per cent. spirits rendered non-injurious to the most delicate stomach	
by the extraction of the fusel oil	25
30 per cent. of an aqueous solution of several herbs and roots, among	
which are most discernible Peruvian and Calisaya barks	30
7ith a sufficient quantity of the soluable of citrate of iron to represent 2 gr	s, to wine-

With a sufficient quantity of the soluable of citrate of iron to represent 2 grs. to wine glassful of the preparation.

- Dr. J. Y. Crawford says: "The dental pulp is not a peripheral extremity of nerve; but a ganglion—a bundle of nerves. It excites nervous reflex pain, and is in action like the iris, to which it is wonderfully near of kin; but is not so amenable to treatment as that delicate organ.
- Dr. W. H. Morgan, Nashville, Tenn., recommends ammonia as the best thing to dissolve away deposits on artificial dentures, claiming that soap does not meet the requirements.

BENZOIC SULPHIDE OF SODIUM AS AN ANTISEPTIC.

E. Heckel, says the Comptes Rendus Bullet. Commerc., prepares benzoic sulphide of sodium, or natriumsulfibenzoat, as it is called in Germany, by dissolving a large quantity of benzoic acid in a concentrated solution of sulphide of sodium. This preparation is perfectly harmless, even when given in large doses. It is easily soluble in water, and contains the antiseptic properties of its two principal constituents.

According to the experiments of Heckel and other surgeons, among whom we may mention Professor Fontan, of Toulon, it is a most valuable dressing for wounds, when used as a wash or upon a bandage. Four to five grammes (30 to 45 grains) of the preparation are used to every quart of water. Its antiseptic properties are very active and promote healing. Heckel considers it to be equal to carbolic acid, and superior both to sublimate and iodoform, as it is not poisonous, whereas the former is, and because it is free from any disagreeable effects like those of the latter.— Therapeutic Gazette, March, 1888.

On the influence of the wisdom teeth in process of eruption and disease in bringing about affections of the throat and lungs, Dr. J. Y. Crawford has made many interesting observations. He states that tonsilitis, inflammation of the mucous membrane lining the respiratory track, and even phthisis pulmonalis are frequently traceable to the difficult eruption of the wisdom teeth. In many cases of throat affections the primary lesion is of a traumatic nature, the closing of a cusp on the outer jaw pinching and hardening the tissues, and from that indurated structure a line of inflammation passes back to the tonsils, which in turn fail to secrete their lubricating fluids; hence throat troubles, chafing, ulceration, etc., becoming a permanent disability.

- Dr. J. Y. Crawford states that the removal of an offending wisdom tooth may prove a factor in averting premature decline.
- Dr. W. H. Morgan, Nashville, Tenn., emphasizes the importance of drilling out root canals before filling, especially in middle aged patients, when the entrance of the canal is apt to be partially closed by secondary dentine. He objects to the oxychloride filling as becoming porous, and either letting offensive gases pass through or absorbing them; and also states that the end of the root should always be reached through the fistula. It will often be found roughened by dissolved dentine, and this should be smoothed off.

Dr. J. Y. Crawford believes that the neglect of the preservation of the natural teeth, and the unnecessary extraction of teeth, often for twenty-five cents apiece, are prime factors in causing the shortening of life in the United States.

Meeting the objection that bridge-work was injurious to the adjoining teeth, Dr. J. Y. Crawford states that he thinks movable plates more open to that objection than modern bridge-work properly applied.

Dr. H. S. Colding is not in favor of replantation, claiming that if a tooth was too frail to fill, he would rather cut it off and crown it. He treats the root-canals of dead teeth with a paste of iodoform and wood creosote, stopping with Gilbert's patent filling material.

In filling roots with oxychloride of zinc, Dr. S. Holland, Atlanta, Ga., inserts a flattened gold wire, bevelled at the end going to the apex, which closes its opening and allows none of the material to pass through.

In the recent Georgia State Dental Convention, Dr. Main stated that his (medical) profession, as a rule, paid too little attention to the condition of the mouth and teeth as a factor in disease; the effects of imperfect mastication, decomposing food, etc., around the teeth on the general health; and readily admitted (though it was not generally recognized) that many forms of throat and lung trouble are traceable to lesions in and around the teeth, many cases of so-called "mumps," sarcoma, cancer, etc., having their origin in diseases of the dental organs.

In the treatment of devitalized deciduous teeth, Dr. Crawford considers it the best practice not to extract, but to keep the teeth non-antagonizing and isolated, and they will exfoliate. Permanent dentition will not be interfered with, although it may be retarded.

Dr. H. H. Johnson, Hawkinsville, Ga., uses oxychloride of zine for filling root-canals, claiming it to be a disinfectant which has a drying effect on dentine. He uses engenol exclusively for checking putrefactive changes, it having no escharotic qualities; non-irritant if pumped into the apex, and not coagulating albumen; also having no objectionable odor, while possessing all the good qualities of carbolic acid and none of its unpleasant ones.

Dr. Abbott does not think implanted teeth are retained in their position either by anchylosis or gumphosis, any more than a nail in a board is retained by any peculiar form of attachment. The inflammation induced in the surrounding bone in the process of drilling out, however, may produce granulations, which force their way into the irregularities on the surface of the implanted tooth.

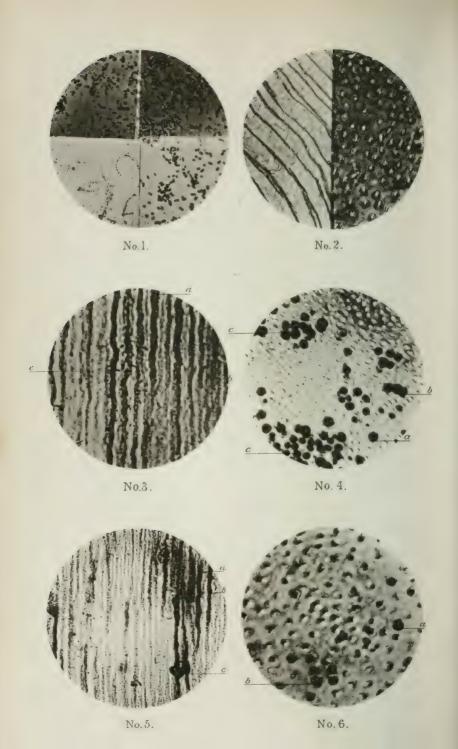
In reference to the form of attachment, he thought the sharp resonant sound given out by an implanted tooth was proof of other than mere fibrous attachment.

The operation of sponge grafting, Dr. Taft thinks, throws light on question of attactment of the tooth in implantation. The cementum of the tooth is structurally ready, like the sponge, to receive the plasma thrown out, which displaces the organized material, and replaces it by living tissues. He says no other hypothesis can explain it; but it is a theory which needs demonstration and proof.

INCREASING THE ANTISEPTIC POWER OF CRUDE CARBOLIC ACID.

Although it has been demonstrated by Koch that pure carbolic acid is one of our best antiseptics, we have been unable to utilize the crude acid on account of uncertain and slight disinfectant power. This was due to the fact that crude carbolic acid is nearly insoluble in water and waterv fluids. Laplace has recently found that the addition of acids, particularly sulphuric, to crude carbolic acid, of different strengths, considerably increases its solubility. better results were obtained by mixing 25 per cent. crude carbolic acid with an equal quantity of concentrated crude sulphuric acid. A thick, syrupy, homogeneous, dark-brown mass resulted, which dissolved readily and completely in water. It was further found that combinations of these two acids possess great disinfectant powers. Anthrax spores, immersed in 2 per cent. solutions of the combined acids, were destroyed in seventy-two hours; and in fortyeight hours when a 4 per cent. solution was employed. In this respect sulpho-carbolic acid surpasses a 2 per cent. solution of pure carbolic acid and crealin, the newly introduced antiseptic, and is only inferior to a 5 per cent. carbolic solution and a 1 to 1000 acid solution of corrosive sublimate. An equally cheap, attainable and effective disinfectant is not known.—Translated from Deut. Medicin. Wochenschr., No. 7, 1888.—Jour. of Surgery and Antiseptics.





DESCRIPTION OF PLATE FOR DR. ALLAN'S ARTICLE ON DENTAL CARIES.

The photographs from which this plate was made were taken by Dr. R. R. Andrews, of Cambridge, Mass., and are wonderfully clear and distinct considering the power employed. They have not been equaled so far as the writer knows. The process employed for duplicating them (photo-gravure) simply reproduces the originals, and gives exact representations of the tissues without retouching, or any change whatever. All personal equations are to a certainty, therefore, removed. Many points had to be thought of in selecting the photographs; the purpose being to combine in one plate, as far as possible, a pictorial history of dental caries. To accomplish this some things most interesting had to be left out, and a method of arrangement adopted not as satisfactory as would have been possible had more cuts been allowed. This will be particularly noticeable in the groupings of the bacteria in the first figure, four plates being combined in one, and in the apparent lack of physical similarity between the figures of natural and artificial caries in long section. It would be easy to duplicate Figure 3 from artificial caries slides. It would also be quite easy to find the counterpart of Figure 5 from natural caries; but it seemed wiser to show to the two varieties rather than to seek for exact similarities. Figures 4 and 6, however, show the same characteristics. The extra shading in No. 6, between the distended tubules. is owing entirely to the mode of preparation of the slide; 4 was taken from a single, stained slide; 6 from a double stained one; 3 and 5 are practically alike, the bulbous expansions (c) in 5 alone differing from 3; but, as stated, these same bulbous expansions are found in natural caries, and are due to peculiarities in the teeth affected, not to any differences in the process. To fully appreciate the plate the reader should refer to some of Dr. Miller's original articles.

No. 1, x 1200. As it was found difficult, except in one or two solitary instances, to photograph the bacteria in situ, pictures were taken from the pure cultures of the bacteria, and four of these are here grouped together.

No. 2, x 1200. Cross and longitudinal sections of healthy dentine, taken where the tubules attained their maximum diameter. These pictures are extra fine, and show beautifully (1) the diameter of the tubules; (2) the thickness of the sheath of Neuman; and (3) the relative amount of space occupied by tubules and their contents to the inter-tubular dentine.

No. 3, x 1200. A long, section of dentine in a case of natural caries taken from the periphery of the teeth: (a) single, distended tubule; (b) two or more fused together; (c) one of the branching canaliculi, also infiltrated with bacteria.

No. 4, x 1200. Cross sections; natural caries: (a) three tubules fused together; (b) single, distended tubule; (c) tubules fusing together to form a cavern or pocket.

No. 5, x 600. Long sections; artificial caries. It will be noticed that this picture has only half the amplification of the others: (a) single tubule enlarged; (b) two fusing together; (c) a bulbous expansion in two tubules. Whether these expansions are caused by the walls of the tubules at these points being weaker than at others, or by a plugging up of the tubules in some way, it would be impossible to say.

No. 6, x 1200. Transverse section; artificial caries: (a) single enlarged tubule; (b) four tubules fusing together. The shading between the tubules is a photographic effect due to the double staining.

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Original Communications.

THE ETIOLOGY OF DENTAL CARIES.2

BY GEORGE S. ALLAN, D.D.S., NEW YORK CITY.

Mr. President and Gentlemen:—It was with much reluctance I accepted the kind invitation to appear before you to-day with a paper on the subject announced. Lack of 'new material and time to redress old matter would seem to have been sufficient excuse for my hesitation, and then, again, you have probably had rather more of dental caries of late than you may think to be a proper allowance. I was, however, told not to write much and that a short summary would be all sufficient as an introduction to the lantern views which would interest greatly and would be new to most of you. With this understanding, I undertook the task.

Some able workers and writers think that in the main the problem of dental decay has been solved, and profess to be able to demonstrate their position—in fact, say they have demonstrated it, and point with much pride and certainty to the proofs. What are they? Let us as briefly as possible look at them.

In order to anticipate a certain class of objections let me here state that no reference will be made to the so-called-indirect-pre-disposing causes of dental caries, but I will admit them at once and give them a prominent place among the factors promoting tooth destruction. Crowded arches, imperfect and faulty development, cracks, fissures—et id genus omne—of promoting conditions,

² Read at the Tenth Anniversary Meeting of the Odontological Society of

Pennsylvania, December 12, 1888.

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

do unquestionably invite decay, but they do not in any way produce it. Keep away the active agent or agents that destroy the teeth, and the most faulty set of teeth will last just as long as the most perfect. Alter the conditions by introducing the active agent or agents and at once all is changed. Where the opportunities for destruction are the greatest, there will decay proceed most rapidly, as a matter of course.

Practically all agree on two points: 1st. That dental caries invariably commences on the outside of the tooth; and 2d, that an acid or acids begins the work of tooth destruction. So much only is common ground. The radical differences lie (1.) in accounting for the presence of the acid in the oval cavity, and (2.) in estimating the resistive power of the tooth itself, whether it be dead or alive. The real bone of contention is whence comes the acid and why does it make cavities in tooth structure instead of uniformly eating it away on all surfaces.

I will call your attention to two theories only. The one has been denominated "The Germ Theory," the other, for want of a better term, I will call the "Protoplasmic Theory." Dr. Miller, of Berlin, is the author of the first, and Drs. Abbott and Heitzman, of New York City, of the latter. To the first I will especially invite our attention, for the reason that it is complete in all details, and thoroughly accounts for the conditions as found in the mouth. To the second I will refer only briefly to show you that it is fallacious from the foundation up.

I premise by saying that the germ theory is the only theory ever presented to the profession that is grounded on a demonstration from begining to end, and from which every possible source of error has been eliminated by the most careful and painstaking series of experiments. It accounts for nearly every phase of caries; shows whence comes the acid that first dissolves the lime salts of the teeth; clearly explains how the animal basis substance is afterwards destroyed and shows how, per force, cavities or pockets are formed in the teeth.

The actual presence of an acid as a commencement or initiative step in the process of decay being acknowledged Miller shows us whence it comes, names it and points out the little organism at work manufacturing it. All other investigations have depended on guess work mostly to account for it. In brief, it is lactic acid that does the work and it is one of the waste products of bacterial life in the presence of a fermentable substance. It is one of the so-called ptomaines. Only a few bacteria eliminate this acid in grow-

ing; but let it be produced and brought into contact with the lime salts of the tooth, chemical action at once takes place. The lactic acid supplanting the phosphoric and carbonic acids of the tooth and forming soluble salts. Fresh supplies of food for the bacteria are constantly obtained from the sugars or amylaceous matters in the mouth, and so each little crack or break in a tooth, or other spot difficult of access, and hard to keep clean, becomes a focus of destructive activity; a little acid manufactory as it were. Were it not for the constant absorption of the acid by the lime salts of the tooth forming lactate of lime, bacterial life, in a cavity, would soon cease. They would be smothered in their own waste products and die, as naturally as we would die were we compelled to remain in a close room in the presence of the waste products of our life, viz., the carbonic acid from the lungs, the urine from the kidneys and the fæces from the bowels; but the lime salts act the part of scavingers for the bacteria and keeps their garden in good condition. The acid first formed commences the cavity, and as solution of the lime salts takes place the bacteria follow after, penetrating and enlarging the dentinal tubuli.

In advance of the bacteria, there is always to be found a zone of semi-decalcified dentine. Exactly what the ptomaines is that completes the work of tooth destruction, breaks down the animal basis substance, is yet to be determined; but it is also a waste product of bacterial life. Up to the date of the publication of Dr. Miller's researches and experiments, the constant presence of micro-organisms in the carious dentine was generally recognized and some writers had even more than suspected that they played an important part in tooth destruction; but is was the good fortune of Dr. Miller to be able to demonstrate the correctness of the suspicion and to remove all doubts by showing how they did their work and from whence they derived their power.

So far, the labors of Dr. Miller might be called analytic; but he went further and synthetically silenced opposition. He took a freshly extracted, healthy, bi-cuspid tooth and sterilized it completely by heat, employing about 300° or 320° Far. All germs, or spores of germs, were thus destroyed. The tooth thus treated was cut into small pieces—some very thin—placed in a tube containing a pure cultus of the bacteria, constantly found in decaying teeth, in the presence of a non-fermentible fluid, and some in the same fluid to which a fermentible substance had been added—beef extract being the former, and beef extract plus two per cent. of cane sugar, the latter. Both tubes were then placed in a suitable warm

chamber and the effects noticed. In the first, though the bacteria flourished, no change was observed in the portions of tooth placed therein. There being no fermentation, no acid was found: in the latter, however, a pronounced action was apparent in a few days, and the pieces on being removed from the fluid were found to be soft and pliable and could readily be cut with a knife or razor. Two or three weeks maceration showed that disintegra. tion and destruction of the substance of the tooth was rapidly going on. Thus far in all respects, so far at least as the first stages were concerned, the action was similar to that observed in using a weak solution of chromic acid—the acid commonly employed in the laboratory for softening teeth, preparatory to section cutting. The sound healthy pieces of teeth thus decalcified were transferred to an ordinary freezing microtome and sliced, stained in the usual way and mounted in balsam, and then placed under the microscope for examination. The preparations thus obtained were found to resemble in a most marked manner those made from natural caries. In fact, so close was the resemblance, that the most expert microscopist could not tell the one from the other. In all essentials they were counterparts. In both are to be found the germs in the distended tubules. In each there is the same breaking down of the matrix and the formation of pockets or caverns by the fusing together of the tubules and bacilli. In each there is to be found, in advance of the germs, the zone of semi-decalified dentine. To this last fact I would draw special attention, it being of vital importance in comparing the two. Thus, a complete demonstration of the bacterial origin of caries was established. A preparation in my possession might be called the caries puzzle. It contains three slices of carious dentine. One, natural, from a living tooth: one, ditto, from a dead tooth, and the third, artificial caries. All have the same characteristics and it is impossible to tell them apart.

In artificially produced caries there is no possible explanation of the result brought about other than that it is due to lactic acid generated by the growth of the bacteria in the fermentable mixture into which the portions of sound teeth had been placed. On the screen, this evening, I will have the pleasure of showing photomicrographs taken from both natural and artificially produced caries, and you will be able to judge for yourselves how accurate my statements are. You will, at the same time, see some specimens of the finest expert work in lantern slides, made with high power objectives, in the world; and will with me give all praise and com-

mendation to our good friend and our honored brother, Dr. Andrews, of Cambridge, for his most successful efforts in our behalf. Lately, I have seen a letter from Dr. Miller, who pronounces them unequalled.

So much for the first division of my subject. As to the second, Dr. Abbott published in the Cosmos, in 1879, a series of papers on caries of the human teeth, to which now, though it may seem rather tardy, I wish to take exception, not, however, for the first time. I would not at this late day call your attention to it, but for the fact that more than one effort has been made of late to keep it alive, especially at the union meeting at Louisville last August; a full report of which was published in the Cosmos and INDEPENDENT PRACTITIONER. I must ask the author's pardon for giving a new name to his theory, still I think the one I have chosen, "protoplasmic theory," is most appropriate; and I believe all will agree with me, and for this reason: Dr. Abbott himself says, vide Cosmos, Vol. XXI, pages 57, 58:

"Before entering upon the consideration of the subject, however, I wish briefly to recapitulate what has recently been discovered by Dr. C. F. W. Bödecker in the minute structure of human teeth. The reasons why I do so are, that not only my own researches are corroborative of Bödecker's discoveries, but a full understanding of the morbid processes is possible only upon a correct knowledge of the normal conditions.

"The dentine is traversed by innumerable canaliculi, which ramificate both toward the enamel and the cement. Each canaliculus contains a delicate fiber of living matter, which is in direct connection with the protoplasmic formations within the pup cavity, with offshoots of the cement corpuscles, and the fibers between the enamel rods. Every dentine fiber sends innumerable delicate conical threads through the cavity of the canaliculus into the basis substance between the canaliculi, where a very minute network of living matter is present, uniting the dentinal fibers with each other throughout the whole tissue of the dentine. The basis substance is analogous to that of bone, therefore glue-giving, and at the same time infiltrated with lime salts. Around each dentinal canaliculus the basis substance is denser than between the canaliculi."

As that portion of the text referring to the enamel is rather long, and as the theory from its frequent repetition is well understood by the profession, a brief statement of its nature only will be given. It is that throughout the enamel, between the rods and running across them, there is to be found a reticulum of living protoplasmic

threads and that this reticulum is in direct connection with a like formation in the basis substance of the dentine and cementum, and through these latter with pulp and circulatory system.

The meaning of the above is that the protoplasmic net-work theory of Drs. Bodecker and Heitzman is the basis on which Dr. Abbott builds his theory of dental caries. A word or so about this protoplasmic theory, to begin with will be appropriate.

Now I take it that a theory as far-reaching as this is should have a deeper and broader foundation than the *ipse dixit* of one, two or even three men. It should be capable of substantial proofs, and the proofs should be forthcoming to any intelligent, careful observer asking for them. The more so if they give a new dress to an old friend, and change his shape so that we fail to recognize him. Let me state, unhesitatingly, that the beautiful pictures exhibited by Dr. H. (vide *Cosmos*, Vol. XXIX, page 259) cannot be exhibited under the compound microscope, and are without existence, so far as their slides are concerned, in either enamel or dentine; and I here challenge them to produce any preparations in proof of their theory that I cannot, by the first microscopists in the country, show to be without value for their support.

So much for the protoplasmic theory, now as to Dr. Abbott's theory of caries which may be found in the Cosmos, Vol. XXI, page 58, and which is briefly summed up as follows: caries is an inflammatory process which begins by a chemical disintegration of the tooth substance, the irritating action of which produces a reaction upon the living matter, protoplasm, in the tooth. The micro-örganisms, which the author freely admits, are a constant accompaniment, are the sequence, and not the cause of caries. The main cause, according to Dr. Abbott, is a vital action, and the disintegration of tooth substance is due to a retrograde metamorphosis in the tissues.

It would be easy to multiply arguments as to its improbability from the nature of protoplasm itself, but I content myself here with the simple assertion that the preparations do not show what he says they show, and fail to substantiate in any degree his theory.

Allow me once more to refer to the specimens themselves. Shortly after listening to Dr. Abbott's paper, I applied to him for a loan of his preparations, as I wished very much to see and study them. Eight or ten were most kindly placed at my disposal, and I took them home to my microscope. This was some ten years ago. My disappointment was great. Let me here state that I went to

work on them with a mind unbiased and ready to accept any truth they might show me. What I saw was simply this: overstained specimens; broken-down tooth-substance in which it was simply impossible to differentiate the elements or tissues; masses of microorganisms and debris of all kinds, but none sharply defined. Is this an overdrawn picture? If it is, let him produce his slides to disprove it.

I want to go into the subject a little further and from another standpoint.

Let me draw your attention to the paragraph in Dr. Abbott's article in which he attempts to account for the presence of the acids that first attack the teeth. The attempt is a surmise or suggestion only, based on no experiments or proofs whatsoever. It is that, in the main, they are generated from the decaying material retained in exposed places in the teeth, and the most important role is given to meats in their various stages of putrefaction. Now, as a fact, free lactic acid can only be derived from meats by the conversion of sarcolactic, which is more or less a constant element in muscular tissue, into lactic, by the aid of some ferment. But the amount of acid which can be accounted for in this way is exceedingly limited, and by no means meets the wants of the case, and we cannot but think it would have been wiser on the part of the writer had he omitted it. Mills and Underwood, in their experiments, subjected sound teeth to the action of the products of putrefaction in meat for weeks and months, but without perceptible results, and finally abandoned their work in disgust, and gladly threw away their material. Another point, appealing at once to the daily observation of you all against the idea that putrefactive conditions can affect the teeth, may be drawn from dead teeth in which the pulp has been allowed to remain a length of time, exposed to the fluids of the mouth. Here you have putrefaction pure and simple; but you do not find it accompanied by caries, although everything is favorable: dead, rotting animal tissues in immediate contact with tooth-substance. It should be found here, if anywhere: that is, if putrefying animal matter ever produces caries. There can be then not the slightest foundation for this supposition—not enough to warrant attention; and, even if it were so, alkalies are also formed at the same time, and in quantity more than sufficient to neutralize any free acid.

It would be impossible, without either preparations or lantern slides made from them, to go into anything like a careful analysis of Dr. Abbott's paper; so I hasten on to the general summary. He says:

"In enamel, caries in its earliest stages is a chemical process. After the lime salts are dissolved out and the basis substance liquefied, the protoplasm reappears and breaks apart into small, irregularly-shaped, so-called medullary or embryonal bodies." In sober earnest, let me ask you how can this be? According to Dr. Heitzman, in living enamel the protoplasmic threads are exceedingly minute, and chemical analysis proves that the actual amount of animal matter in it is only some four per cent. at the maximum. How then can the protoplasm reappear? Either the great bulk of the enamel is but an allotropic condition of protoplasm—and therefore enamel is protaplasm pure and simple, and needs but the vivifying presence of an acid to manifest itself, or else the small amount contained in the threads must grow prodigiously. But whence can it draw its nourishment? Not from the blood, for the tooth, dentine and enamel is non-vascular, and the Doctor certainly would not say the nourishment came from the decomposed food and matter contained in the cavity? If he suggested such a thought, he would at once destroy his own theory. But his expression is, "the protoplasm reappears." Then it never could have been dead, or otherwise it would not be the original protoplasm. Here we face another difficulty. In all the various papers published by Drs. A. B. and H., they take the ground that both dentine and enamel are formed by the direct conversion of the odontoblasts on the one side into dentine, and of the ameloblasts on the other into enamel. It would seem then-I want to be careful in my expressions, that these tooth-forming cells, having been converted or transformed into something else—something certainly different in its nature from the original protoplasm, would find some difficulty in returning to their original medullary or embryonal condition. The puzzle is too great for me. So much for their theory of decay as found in enamel: Now what of that found in dentine? of which Dr. A. says:

"Caries of dentine consists in a decalcification, and in turn a dissolution of the glue-giving basis-substance around the canaliculi as well as between them. The living matter contained in the canaliculi is transformed into nucleated protoplasmic bodies, which, together with protoplasmic bodies originating from the living matter in the basis-substance, form the so-called indifferent or inflammatory tissue." (See Cosmos, vol. xxi, p. 179.)

"Caries of a living tooth therefore is an inflammatory process, which, beginning as a chemical process, in turn reduces the tissues of the tooth into embryonic or medullary elements—evidently the same as, during the development of the tooth, have shared in its formation—and in its development and intensity are in direct proportion to the amount of living matter they contain, as compared with other tissues." (See Cosmos, vol. xxi, p. 179.)

A similar condition to that found in enamel, but more pronounced, is thus stated by Dr. Abbott to exist in caries of dentine. As there is no question as to the relatively larger amount of animal matter to be found in the dentine compared with enamel, we would naturally expect to find in the dentine more positive proofs of inflammatory conditions provided any such existed; but, as I stated before, my microscopic examination of his slides utterly failed to substantiate his theory. No such thing as medullary or embryonal elements could be distinguished.

I would draw your attention to the fact that both enamel and dentine are non-vascular and not influenced by the circulation; therefore no true inflammatory conditions can exist. Search your works on pathology from beginning to end, and you will fail to find any inflammations described that are not in a greater or less degree dependent on the circulation for their inception and continuance. Cut off any organ, or a part of the body, from the circulation and you cannot, in such organ or part of the body, bring on inflammatory changes. Decomposition and death will follow, but unaccompanied by inflammatory conditions. Dr. Abbot admits this when he says, under the title of aphorisms: Cosmos, vol. xxi, page 180.

"The medullary elements, owing to want of nutrition and to continuous irritation, become necrosed, and the seat of a lively new growth of organisms common to all decomposing organic material." The italics are mine.

Of course, so far as the transmutation of the bases substance of the dentine into embryonal or medullary elements is concerned, the same difficulties exist as in the case of enamel; nor are they a whit less powerful. Embryonal elements can only be derived from pre-existing embryonal elements, and such growth can only take place in the presence of the proper conditions of food supply and life activity. Both of which are here absent. It is true the contents of the tubuli is living matter, but hardly embryonal or protoplasmic. It is matter that has been derived, formed, from protoplasm. The effect of the acids producing decay would be to destroy living protoplasm as a first effect, and the plugging up of the tubules by micro-organisms, acknowledged by Dr. Abbott to be universally present, would cut off all possible connection between the living pulp and the seat of decay. Think of it a minute

what are we called upon to accept as sound pathology. A dense, mineral tissue formed, as they say, by the direct conversion of embryonal tissue is acted on by an acid, which dissolves the mineral elements and immediately it is changed into its antecedent protoplasm. Dead matter changed into living matter, and that without the intervention of living matter. The whole theory is certainly new and depends on new laws to sustain it. In the whole domain of pathology we have nothing like unto it.

At first sight it would seem strange that the phenomena attending caries of dead pulpless teeth should receive so little consideration at the hands of the founders of the inflammatory theory. Dr. Abbott alludes to them only incidentally, making them of secondary importance. In one place he says: "The decay of artificial teeth, either human or ivory, in all probability runs either an acute or chronic course, according to the amount of lime salts infiltrated into the glue-giving basis substance." In aphorism No. 8, he says: "In dead and artificial teeth, caries is a chemical process assisted only by the decomposition of the glue-giving basis substance of dentine and cement." In the main, he would have us look upon caries in these cases as of a chronic nature. The truth is that there are no marked differences discoverable in the carious process whether it attacks either living or dead teeth. In both cases, there is the same formation of cavaties, relatively the same rates of progress, and under the microscope, in prepared specimens, the same display of distended tubules filled with micro-organism; the same advanced zone of semi-decalcified tooth substance preceeding the germs, and the same cavernous breaking down of tooth substance as the animal glue-giving basis substance melts down under the continued action of the bacteria-produced ptomaines. These facts alone would seem to furnish an all-sufficient answer as to whether the inflammatory theory ought to live or die.

Summing up I would say that the germ theory is the only one so far that clearly and satisfactorily accounts for the acid; the prime agent in tooth destruction. The inflammatory theory simply begs this question or offers a lame hypothesis.

The germ theory alone can repeat out of the mouth the processes that go on within the mouth, and produce an artificial caries simulating perfectly the natural caries of the teeth.

The germ theory fully explains the distended tubules always found in dental caries and the broken down basis substance. The inflammatory theory is silent as to the distended tubules, and might as well be as to the breaking down of the basis substance and the formation of cavities in the dentine of diseased teeth.

THE TREATMENT OF PROXIMATE SURFACES.*

(Concluded.)

BY SAFFORD G. PERRY, D.D.S., NEW YORK.

If I shall not weary you too much I will now give a few moments to the consideration of some practical points in operating on the approximal surfaces.

The ideal filling on the approximal surface of a bicuspid or molar, is one that shall be large enough so that on close inspection its margins shall be in sight, and thereby safe from capillary attraction on all sides except along the cervical border. But it shall not be large enough to be seen by the non-professional observer, nor shall it go under the gum, nor tend to weaken the great arch that connects the two domes or cusps of the teeth. It shall not be filed or finished down to a flat surface, but in outline it shall follow the contour of the original tooth.

On such a protected surface decay is no longer possible, and it is not too much to say that such a filling renders the tooth safer than if it had never decayed and been filled at all. This filling is one that can very often be made. If the decay is very slight it will not be easy, and if the teeth are of good structure it will not be advisable to get the free margin. If it is extensive, it will not be possible to save the great grinding surface arch.

The manner in which I make this ideal filling is by applying the dam, adjusting a separator—of the two bar pattern generally, as they are more out of the way—and commence to turn the screw, giving a few moments' rest between each effort. I then select the direction from which the filling will be introduced, and shape the outlines of the cavity in accordance with this general plan. If I enter the cavity from the coronal aspect I am very careful not to cut away too much of the grinding surface arch. If from the lingual side, I cut the opening rather freely, in order to reach the cavity and to have the filling reach well out upon the lingual side, where its borders will be swept clean by the friction of the food and the washing action of the fluids of the mouth.

Those cavities are not so easily reached and filled from the lingual side, but by the aid of large mouth mirrors the work is greatly simplified, by standing erect over the patient and working by reflection.

If I decide to enter from the buccal aspect, I cannot cut so

^{*} Read at the Tenth Anniversary Meeting of the Odontological Society of Pennsylvania, Dec. 13, 1888.

freely in entering the cavity, unless it is on the posterior surface, because of the danger of making a filling that would show. But though I feel constrained to make a smaller opening I have the advantage of being able to fill directly and easily into the cavity.

These cavities I prepare with the smallest burs when the engine is used, and with delicate excavators of the spoon variety that are made with very flat and narrow shanks, and with such peculiar curves that every part of the cavity is easily reached. The idea of these flat shanks, which is embodied in both the excavators and pluggers I use, is one that I got from Dr. Darby. As will be easily seen, it gives the greatest amount of strength to an instrument that can be used through the narrowest space. Unless formed by decay, I make the under cuts in all cavities of this class very slight. I make a retaining pit at the distal end of the cavity, and then proceed to fill with the very delicate pluggers here shown. Most of these pluggers swell at the ends in form of a bell. The ends are flat and have serrations as fine as can be made. For many years I have used pluggers with this peculiar swell at the ends for all forms of cohesive and semi-cohesive gold. They are particularly well suited for crystal gold, of which I use a great deal. This form of point runs through many of the pluggers I use for hand pressure, the automatic, the mechanical, the electric, and in heavier forms for the hand mallet. The shanks of some of the smaller ones are so slender that they can be used with the utmost precision through very narrow spaces.

By the use of these delicate cutting and filling instruments, cavities can be prepared and filled from the grinding surface without imparing the strength of the great arch, or from the buccal side without bringing the gold out so that it can be seen except on close examination. In nearly all cases this can be done by the use of the separator without previous wedging. If I can get space enough to allow a strip of thin sand paper to pass between the teeth I can generally fill them so that when the separator is removed and the teeth have returned to their places the edge of the filling can be just seen on all sides except along the cervical border.

If the teeth are very soft and predisposed to decay, even small cavities, when properly prepared, are likely to become large enough to allow these free margins of the fillings. If the teeth are good it is not necessary to get these free margins, although it is well to do so on the lingual and buccal side if too much cutting is not required. Occasionally teeth will be met with where the conditions are all so favorable that it is not necessary to get a free edge on

either side. To cut out the decay and to fill them accurately will be sufficient to render them safe indefinitely.

Through many of these narrow spaces I use Watts' crystal gold in very small pieces. It is a wasteful way in which to use gold, for many of the pieces will be dropped or injured before getting them in the cavity through so narrow a space, but this gold stays where it is fixed and is so soft and adjustable, and works so beautifully if used with these bell shaped pluggers, that I often waste time and gold in order to get the fine result that can be had, as I think, in no other way. Undoubtedly strips of soft or cohesive gold are more readily used through these narrow spaces, but the soft gold does not always stay where it is placed in such shallow cavities, and the cohesive gold is too hard and stiff. The crystal gold occupies a medium position between the two, and possesses the best qualities of both. Nearly all my professional life I have used crystal gold more or less, and I have never seen any reason to distrust it. It is not, however, a gold that will give good results unless it is worked with very great care. Every piece must be fixed and condensed before another piece is added. If used in this patient way not much force is required, and an absolutely certain result may be expected. I am satisfied that those who have failed with it have used it in too large pieces and have expected to get on too rapidly with it.

Some of the small cavities in the back teeth I fill with amalgam, and generally with very good results. During the last two years I have filled many of these with copper amalgam, and with excellent results; excepting, of course, discoloration of the fillings. Whether this material will stand on these sheltered surfaces for long periods of time I cannot say. I have noticed a slight waste of the surfaces of some of my copper amalgam fillings, and I could not tell if it was due to mechanical wear or to a disintegration of the surface by galvanic or chemical action. If to the latter, these sheltered surfaces may not prove favorable to them.

The advantages of this ideal filling are that the shapes of the teeth are perfectly kept; the great arch of enamel that binds the two cusps together is not broken, and yet by extending from the lingual to the buccal side, even if not to a free edge on the grinding surface border, the vulnerable part of the tooth is completely protected. It is well known that decay generally begins just above the point of absolute contact,—in fact, on the surface that would be covered by such a filling as this. Still another advantage is that the gum is not disturbed in the least. At the cervical border I do not cut

under the gum as much as formerly, but I leave the diminishing enamel, whenever it can possibly be left, for I can never hope to carry the filling under the gum and finish it so as to get quite as good a condition of this easily inflamed tissue as when it rests on its native enamel.

It must be remembered that in packing along the cervical border the force is applied directly against the enamel edge, and if it is always done by gentle hand pressure and with soft forms of gold, the enamel, which grows so thin as it goes under the gum, would not be shattered and destroyed, as it is almost certain to be if the mallet and cohesive gold are used. The delicacy of the small pluggers shown will indicate how gentle this pressure must be, as much force would be certain to break them. I have them made delicate partly to insure this careful use of them along this border.

I want to call particular attention to this filling that I have ventured to call the ideal one. There are some very interesting facts grouped about it, and I cannot resist the impulse to sound the alarm in reference to a method of making these fillings, which, like the practice of making permanent separations, is full of temptations and dangers. I refer to what I have already alluded to and condemned, the habit of cutting boldly down from the grinding surface in order to get at the cavities, and to be able to fill them more rapidly and more easily. As with permanent separations, though in nothing like the same degree, I speak with sad experience of this practice. In that early period before alluded to I used the Varney pluggers for most operations, and as they are nearly all straight instruments, with heavy shanks, it was necessary to open freely into all cavities to be filled with them. It was also my habit then to use more cohesive gold than I use to-day, and of course this necessitated a free, wide opening into all cavities. The result of this practice was, in the first place, a great deal of cutting, and in the second place a great deal of filling; and then a great deal of finishing. And after it was all done, although there was great strength and promise of durability, yet there was a great mass of gold and an artificial condition that was not pleasing to contemplate. The result of that practice leaves many bicuspids filled on both approximal surfaces, the great arches gone, the fissure between the two fillings filled, and the great domes of the cusps standing alone, greatly weakened and ready to split off if a shot from a game bird or a splinter of bone from a chop is caught and wedged between them by the sledge-hammer blows of

the lower jaws. The enamel does not coalesce in the fissure, so that the strength lies in what I will call the enamel rim around it. If this rim is cut, as is generally done in filling, even small cavities on the approximal surfaces, much strength is irretrievably lost, and the first step in the downward course of the tooth is taken.

In these days of matrices there are great temptations to cut through this rim, even for the filling of small cavities.

Separators, with all their possibilities for good in careful hands, must also come in for a share of blame here, for as men abandon the habit of preliminary wedging and depend upon the separator, in addition to the slight space that can comfortably be made with the screw, there is the temptation to take a little off from the grinding surface border of the tooth in order to reach the cavity and complete the operation at a single sitting. This is an ever present temptation, and is so potent ,that with firm teeth, I often guard against it by still resorting to slight preliminary wedging with tape, two or three days before operating.

If the cavities are so large that this rim cannot be saved and the ideal filling made, then of course there is no escape from cutting boldly, and in most cases to and including the fissure. There are not many cases where the fissure is reached that it is not best to cut it out to its extremity and fill it in connection with the approximal surface. If left unfilled it may cause a leak that will undermine the whole approximal filling. For some years past it has been my practice to save this coronal arch whenever it was possible, even if it involved more work and more care. And with children it is very common with me to open the permanent teeth with a separator, and cutting out the decay with the delicate instruments before mentioned, fill them with red gutta-percha, expecting to wait until the teeth have become more dense and in better condition to receive gold fillings. It is sometimes surprising to see how many years these little ones will last on these sheltered surfaces, and without danger of wedging and displacing the teeth from the expansion of the filing, as there is so little of it. It is also surprising to note how the teeth improve in the meantime. But if the cavities are large this is often a wretched practice, as the expansion of the gutta-percha displaces the teeth so that if filled again with gold or amalgam there will be a long period of time when the space so made will give all the annoyance of those made by permanent separations. I have seen a few instances with adults where the teeth never returned to their proper places, and being beyond the reach of exaggerated contour fillings, gave no end of

permanent trouble. If the approximal cavities are large and, I desire to use, for children or adults, a plastic other than amalgam, to avoid the above danger I use a little gutta-percha—sometimes amalgam—near the gum and fill the rest of the cavity with oxy phosphate. This method of treating approximal surfaces, first undertaken to carry patients over the spring until autumn, or from the holidays until the summer vacation, has so often exceeded my expectations that for many years I have adopted it as one of my means for regular and somewhat permanent treatment for young, soft teeth, and for frail and crumbling teeth of any age. If senile conditions exist I resort to it constantly.

If there are dentists who make permanent separations because they doubt their own ability to make lasting contour fillings of gold, I think they would do better for their patients by adopting this plan; for by it they could easily preserve the shapes of the teeth.

It will sometimes happen, in opening into a cavity from the buccal or lingual aspect in order to save the coronal arch, that a very thin matrix of steel, platinum or German silver can be used to great advantage when adjusted and tied, as shown in a case I will hand around. If the opening into the cavity can be a large one, this matrix is nearly perfect; but if the opening is small the matrix, however thin, takes up room, and is an obstruction rather than an advantage.

It can be sometimes used to very great advantage in filling good sized cavities with soft gold in the molars where it is desirable to save the coronal arch. For amalgam, gutta-percha or oxyphosphate in these places it is indispensable. Also for filling the approximal surfaces of the incisors with any material whatever when the cavities are opened from the under side it is of the very greatest value. The packing of crystal gold, No. 1 or 2, by hand pressure, into a cavity so prepared, standing upright over the patient and using such a reflecting mirror as is here shown, is an operation that gives me more pleasure than any other operation in dentistry. It is the easiest, as it is the most accurate way, in which, such a cavity can be filled. The matrix prevents the possibility of the instrument slipping through, and the gold can be packed against the enamel borders in a manner to satisfy the most exacting. bell-shaped points and nearly right angle curved instruments work to perfection here, as in so many other cavities. The form of the tooth is kept, and when the matrix is removed but little finishing will be required. A thin, flat, highly polished burnisher rubbed on a moist piece of soap, and carried with a firm hand along the edge

when this beautiful form of gold was produced. I could almost honor Dr. Dwinelle as much for the share he had in discovering and producing this form of gold as for the pictures engraved by his own hand illustrating in the old American Journal of Dental Science his early contour fillings. In fact, I do not know but that the two are so interwoven that they should be grouped together when placed to his credit. I do not think crystal gold is suited for a hasty, careless operation; but for one who aims to be a fine artist in filling teeth it is, in my judgment, the most perfect form of gold ever produced. But the care necessary in its use will make a good filling of almost any kind of gold; and, after all, it is the result we should care for, and not the individual preference of the operator, or the manner in which the final result is reached.

When the decay on the approximal surfaces of bicuspids and molars has gone so far that the great arch cannot be saved, and the cavity must be opened from the grinding surface, the question of using a matrix is the one first to consider.

From the first introduction of matrices by Dr. Jack until the last few years, I have been rather shy of them; but at the present time I have come to use them in some form or another in most cases where the opening into the cavity is a free one.

The form I use most perhaps is a very thin one of steel, which I described when the separators were brought out. This matrix I use of different widths. If the opening into the cavity is not very free and there is danger that a matrix will shut out the light, and obstruct the cavity, I use only a narrow band along the cervical wall. This serves as a guide in packing the gold and prevents the plugger from slipping over the cervical edge. If the opening into the cavity is large I use a matrix of full width and let it serve as my guide in reproducing the shape of the tooth. These matrices I hold in place with the separators, which clasp them near the gum and hold them near the cervical wall where they most need support. Sometimes, in addition, I secure them at the cervical wall with a simple wedge of wood.

I have also devised a means of holding them in place by the use of a stiff rubber dam clamp, on the jaws of which are soldered lugs or wedges which hold them firmly by means of the spring of the clamps. I have also a form which is made more adjustable by allowing the lugs to rotate. This is in the form of the bail of a pail, and can be turned down out of the way either in front or back of the cavity.

Another form of this holder, which I have used for several years with great satisfaction, is made in the same manner, but is fastened by a screw, which holds it more securely than is done by the clamp or the bail. Perhaps the greatest merit of this device is that it is very quickly applied. It is always ready, almost always fits. and is put on or off in an instant. I have very often used with the greatest satisfaction the first simple matrix devised by Dr. J. A. Woodward. It is rather thick and very strong, and where there is room to apply it, it is one of the most satisfactory that I have ever used. Another matrix, devised by Dr. W. A. Woodward and held by screws impinging on the adjoining tooth I have used countless times with the greatest satisfaction. By loosening the screws gradually the filling can be bulged without unseating the matrix. Of course all these matrices depend upon the adjoining tooth for support. Dr. Guilford's as well as Dr. Brophey's matrices have the merit of depending for support only upon the tooth operated upon, and are of great value. I have devised a matrix which is held also by the tooth being operated on by tying with floss silk, or brass wire, which is threaded through holes at the ends. But Dr. Klapp recently exhibited in New York a somewhat similar one, though he uses a single thread of silk, which is threaded through the two holes and passed several times around the tooth and the matrix and then tied. This holds the matrix closely at the cervical wall, and it is a decided improvement over my method of tying it. Sometime since Dr. Andrews described a method of tying a matrix, but I do not remember that he made holes through it in this way.

I have sometimes used Dr. Klapp's matrix when I thought no other form would have done so well. It is so simple that the wonder is that it had not been thought of before. With these, as with other improvements in our art, complex and laborious means are often first tried only to be laid aside for those more simple and direct. In the use of any matrix, the whole attention must be ap plied to the periphery of the cavity—the ultimate point where the matrix and the edge of the enamel meet. The most serious objec tion to the use of any matrix whatever is the great danger of failing to get a solid condition of the gold here. My fear of failure at this point is so great that after all I fill many cavities without any matrix at all. I can then see and know that I have my edges perfect as I go. In starting a large filling it is the practice of many operators to use soft gold in large masses, prepared either in the form of ropes, strips or cylinders. I doubt somewhat the wisdom of this plan under all circumstances. There is the

temptation to use the gold in such large masses that it will not be thoroughly condensed, and there is also danger of the movement of the gold unless it is very firmly and carefully held until the filling is well advanced. If the gold is not solid along the cervical border it will not finish in such a manner as to permanently protect the edges. If the different forms of mallets are used here the force may be sufficient to shatter the enamel border. This I think is a most common occurrence, particularly when that invaluable instrument, the automatic mallet, is injudiciously used here. If one or two small retaining points are made, and crystal gold in small pieces is packed here with rather delicate instruments and hand pressure, a perfect adaptation can be easily made, and when the filling is finally finished, the gold along the cervical border will be solid, and will cut and finish like coin. After a little gold is packed along this delicate border by hand pressure, any one of the mallets may be used to great advantage. The Bonwill mechanical mallet is a marvellous instrument, and, in my judgment, is the most valuable of them all. I never use it in large operations without feeling that its inventor has conferred a lasting benefit upon the profession. For crystal gold it is perfection. I consider it more difficult to get a good adaptation along the side walls than along the cervical border, where the gold is packed directly against the walls. In cases where one must work through a narrow opening, and where the gold must be packed almost by guess. I should prefer the foil to crystal gold, and should try to get the best result I could with strips packed by steady hand pressure and then followed by the automatic mallet.

I do not expect my objection to the use of large masses of soft gold along the cervical border, packed with great mallet force, will meet with favor. But here again I must fall back upon my own experience, and I must say that the old fillings which have lasted so well were almost invariably made with cohesive gold throughout.

Cohesive gold encourages a patient careful habit; while soft gold leads one into a hurried and careless one.

There is not time to give attention to the approximal surfaces of the front teeth. I can only say that almost invariably I fill them from the lingual side. Undoubtedly the Arthur separations can be made on the under surfaces of these teeth to greater advantage than between any other teeth in the mouth; but I do not like to weaken the under plate of enamel, and I generally cut through it only a channel the width of the diameter of the cavity. This lays the cavity open so completely that it can be prepared and filled most

easily and most accurately. I never under any circumstances sacrifice any of the enamel on the labial side. Nothing is more painful to me than to see the gold from that side.

In the care of the approximal surfaces of the temporary teeth, I endeavor to follow the general plan here described; except that with the front teeth I make free spaces up to the gum. I do this with these teeth sometimes in anticipation of decay. I have never filled a temporary tooth with gold since I have been in practice.

The back teeth I fill with copper amalgam, being careful on the approximal surfaces to preserve their shapes, so that the little tots can eat and grow in comfort, unconscious of the possibilities of dentistry.

In operating on the approximal surfaces of any of the teeth, the matter of light and illumination is of the very first importance. I have devised an attachment to the operating chair for holding a condensing lens, which on dark days I find of the greatest value. I also use it for concentrating gas-light at night. The lens is four inches in diameter, and of about twelve inches focus. I have had the good fortune to find at an opticians small concave, reflecting mirrors, two inches in diameter and of about three inch focus, that, in connection with the S. S. White "Jumbo" glass, have proven to be a most valuable acquisition. After becoming accustomed to these, I should not be willing to go back to the ordinary means of illumination.

I am not willing to leave the subject of the approximal surfaces of the bicuspids and molars without calling attention to several important points that I think are often overlooked. In restoring the contour of badly decayed teeth or those that have been badly cut away, I have many times endeavored to save work and compromise by disregarding strict contour and have built out an abutment, that, touching the centre of the adjoining tooth at a single point should hold the teeth in position and protect the gum. Such a form of filling holds the teeth in position, but it does not always protect the gum. Unless the filling is bulged the whole width of the tooth, and rests against the adjoining tooth by a broad surface, the festoons of the gums will be exposed and kept in an irritated and disturbed condition by the impact of food.

Another error is that of building the filling rather scant from the gum to near the grinding surface and then making a rather sudden swell of the filling in order to secure the point of contact. This leaves an ugly space between the tooth above the point of contact which catches food and causes annoyance. So that at last it comes to be seen that to get the best result we must follow the natural outline of the tooth in each particular case. Each mouth has its own pattern that must be regarded, and accepted as the true guide in shaping the fillings.

All that has been said at such length in this paper could have been put in the single sentence "get free edges, if possible, for your approximal filling, and shape them to the original outline of the tooth." An hour's time would have been saved to you, and you would have been spared the weary task of waiting for the end of a paper that after all can say no more than this.

If the profession is not ready for the acceptance of such a proposition, it will be so in time, for we can no more check its onward growth than we can disarrange the order of the Universe. The marvellous progress of the past will be continued in the future. Nothing of real value will be lost to us. Appliances and conveniences will drop out only as they are superseded by those more valuable. And so we shall go on until the time will be, if it is not yet, when the natural shapes of the teeth will be our guide. We can never exceed this high standard, but we will never be content until it is attained. Those who cannot work up to this standard will give way to those who can, for the inexorable law of the survival of the fittest operates in this as in all other fields of effort.

It does not yet enter into the minds of any of us to conceive the future greatness of our profession. Macauley's New Zealander will never sit upon *its* London Bridge wondering where all its glory and greatness are gone. Built upon the needs of human kind it will endure while those needs last.

VOLUNTARY TOOTH MOVEMENT, RESULTING IN EXCESSIVE INTER-DENTAL SPACES.*

BY S. H. GUILFORD, D.D.S., PH.D., PHILADELPHIA.

Notwithstanding the full consideration that the subject of irregularity of the teeth has received at the hands of investigators and writers in recent years, there is one phase of the subject that has as yet received little or no attention.

I refer to that condition in which the teeth, instead of remaining in contact with each other as they normally should, become separated by spaces more or less great, constituting a deformity

^{*} Read at the Tenth Anniversary Meeting of the Odontological Society of Pennsylvania, December 13, 1885.

that is not only unsightly, but one that carries with it the possibility of lessened usefulness to the individual.

All of us, at times, have seen cases in which this condition was present; but as the deformity was not a very serious one, as compared with others that we are accustomed to meet with, or, perhaps, because there seemed to be no ready way of correcting or preventing it, its real importance has been overlooked and its etiology not been inquired into.

I bring the subject to your notice on this occasion in the hope that by interchange of opinion and subsequent investigation we may be able to arrive at some conclusion in reference to its etiology, and devise means for its prevention.

The condition presents itself to us in a variety of form and degree and under varying circumstances. Not infrequently during the earlier period of second dentition the erupting teeth, especially the anterior ones in the superior arch, assume a regular position so far as the line of the arch is concerned, but they fail to approximate as they should, thus leaving spaces between them. When the later erupting teeth seek their proper position the force exerted by their pressure will usually obliterate the pre-existing spaces by causing the neighboring teeth to move into contact. Should certain teeth be lacking, however, or fail to erupt, the interdental spaces will remain as a permanent disfigurement. In some cases, as where the superior lateral incisors are lacking, these spaces are often excessive, and we have no other means of remedying the deformity than the insertion of an artificial tooth.

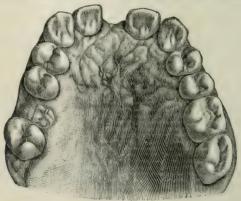


Fig. 1.

Fig. 1 represents a case of this kind that lately came under the writer's care.

The space between the superior centrals is nearly as great as the width of one of the adjoining teeth. Inquiry developed the fact that these centrals erupted in their present positions. The laterals were so much delayed in eruption that when they appeared the cuspids had already taken position next to the centrals. As a consequence the laterals were obliged to find room inside of the arch, and sometime later were extracted. The patient is a lady about twenty-five years of age. All of the other teeth are in normal position.

Interdental spaces of less extent are also frequently found in young patients, which are clearly due to the peculiarities of inheritance. A child inheriting the large jaw of one parent, with the small teeth of the other, cannot help but have spaces between them, from the fact that the united diameters of the teeth are not as great as the length of the arch. In such cases the spaces are usually very evenly distributed between the ten anterior teeth.

Another instance of the occurrence of interdental spaces after maturity is passed is when the six anterior teeth of the superior arch are gradually forced forward and outward until they assume a fan-like appearance, and protrude at quite an angle from the nearly vertical line of their normal position. Fig. 2 represents this condition.



Fig. 2. (AFTER TALBOT.)

Protrusion without spaces indicates either a crowded condition of the teeth, too large teeth for the jaw, or an hereditary mal-relation between the two jaws. Protrusion with spaces, however, is of an entirely different character, and indicates that the teeth have been forced out of their positions after cruption by some

mechanical agency. An examination of this class of cases will reveal the fact that there is an abnormal over-bite, due, in most cases, to short molar crowns and long inferior incisors. The impact of the lower incisors and cuspids against the inclined palatine surfaces of the superior ones, causes them in the course of time to yield to the force and move outward into mal-position.

It is not, however, of the deformities just referred to that I wish to speak, for in each of these cases the causes responsible are plainly apparent and well understood.

I desire, instead, to direct your attention to that other class of cases in which, at maturity, the teeth of each jaw are found to be in normal position and contact, but where, later in life, spaces appear between the teeth of either jaw, at one or more places. The formation of these spaces is very gradual; so much so that, to attain any considerable extent, a period of five, ten or more years is often involved. For this reason they are seldom noticeable before the patient has reached the age of twenty-five or thirty years.

The slow increase of these spaces may be due in part to the character of the cause producing them; but it is probably especially due to the fact that in most cases the movement of many teeth is necessary to their formation.

In addition to the slowness of growth of these interdental spaces, there is another peculiarity associated with them, and that is the absence of any apparent cause for their occurrence. It is this fact that has led me to study this form of tooth movement.

The condition is certainly an anomalous one, for we see these spaces occurring between the teeth of individuals of varying ages, without regard to sex, condition of health, or peculiarity of tooth or alveolar structure.

The problem that presents itself for our solution is: Why should this condition be met with, and what are the causes operative in its production?

Few theories have as yet been advanced to account for it.

Where a single space exists, it is usually found on the median line, between the superior or inferior central incisors. This fact has led some to infer and advance the theory that the space has been caused by a gradual thickening or enlargement of the alveolar septum; which would seemingly be most likely to occur in the line of union of the superior maxillary bones, or the two halves of the inferior maxilla. If such space should occur through the enlargement of the septum, the causes producing such enlargement would

still remain to be explained. More than this, the space thus caused would naturally have to be filled by the enlarged septum in its full extent. Such, however, is not the case, as we can readily see by examining any case in which the space is unusually large, as in Fig. 1. In this case, it will be noticed that there is quite a depression in the alveolar outline, similar to that which occurs after a tooth has been extracted. Again: If the interstitial growth along the median line should be held responsible for median separations, it would fail to account for similar spaces occurring some distance from that line, as illustrated in Fig. 3, where the separation has



Fig. 3.

occurred between the central and lateral incisors. We must look further than this for the cause.

Other practitioners have urged the theory that excessive interdental spaces are produced by the extraction of some of the posterior teeth; and that the anterior ones, being

thus relieved of their support and pressure, naturally fall back somewhat towards this space. While this theory does not explain the cause of tooth movement, it certainly indicates one of the factors in such movement, and to this extent is correct; for we could have no backward movement of the teeth without space having been provided for the purpose.

All observers have noticed the frequency with which separations occur between teeth immediately anterior to the space created by the extraction of one of the larger teeth; as, for instance, between the bicuspids when the first permanent molar has been removed. Such movement cannot well occur where the occlusion with the teeth of opposite jaw is normal, for the interlocking of the cusps will prevent it; but where the occlusion is abnormal, such falling back of some of the side teeth is very likely to occur and without any definable cause. Why do these teeth move when room is provided? Is there so much pressure between teeth normally in contact that when relieved they are forced toward the space, or is the movement the result of that variation from law so often noticeable throughout nature, which has not as yet met with an explanation? I think, the latter. In the investigation of cases of this kind, where but a few teeth anterior to the space have moved backward, I have, in all cases, found the soft tissues surrounding the teeth to be healthy, and have failed to discover any local or general conditions that could be held responsible for such movement.

I therefore think that in cases of this limited character we are justified in assuming that the movement is caused by that undefinable tendency of these organs to wander from their normal positions whenever the opportunity occurs.



F1G 4.

In the larger class of cases, however, where separations do not occur in proximity to the created space, but at some distance from it, and where a number of teeth have to be moved in order that the separation may occur, we must look for some cause which shall be great enough to produce the pressure necessary for the movement of so many teeth.

Interdental (spacing of the character just described we find exhibited in a variety of forms. We may have it as a single space between the central incisors of either jaw, as shown in in Fig 4, or at some other point not far distant, as shown in Fig. 3. We may see it manifested in the form of regular or irregular spaces between several adjoining teeth, resulting in such case, in the superior arch, in forcing the teeth out of line and producing among the anterior teeth the same fan-shaped condition as often results from abnormal occlusion.

Again we see it, although comparatively rarely, in the teeth on one side of the median line, while those on the opposite side are in



Fig. 5.

nowise affected. Fig. 5 represents a case of this character. The patient is a lady about 25 years of age. You will notice that large spaces exist between the centrals, between the central and lateral, and between the lateral and cuspid, while the two remaining teeth on the opposite side of the median line are in true position and contact. In the course of the formation of these spaces the three teeth have not only been pressed apart, but they have also been forced forward out of the line of the arch. Originally all of these five teeth were normally aligned and in contact, but about ten years ago the separations began to form, and increasing year by year, they recently seemed so disfiguring that she insisted upon having them extracted. In a model made from an impression taken after the extraction, I have inserted the teeth in the position they occupied before removal.

In all the cases coming under my notice, where one or more separations occurred in the midst of a number of firm and regular teeth, I have observed that the gum tissue in the interdental space was hypertrophied and inflamed. The uniform occurrence of the inflamed tissue in connection with the spaces, naturally suggested the idea that either the same underlying cause was responsible for both conditions, or that one of them was intermediate between the ultimate cause and effect.

The result of the placing of rubber or any expansible substance between teeth is well known to us all. Where teeth are in normal contact, many of them on either side of the elastic substance will have to move before the desired space is obtained. The size, firmness, or number of the teeth is no bar to their movement if time be allowed for it.

Now, the tough elastic tissue that covers the alveolar arch, or passes between the teeth, is of just such character that if irritated and consequently enlarged would produce considerable pressure upon the adjoining teeth, and such pressure would necessarily, in the course of time, cause them to move apart. If, then, teeth are capable of being moved from this cause, and it is entirely reasonable to suppose that they can be, it only remains for us to ascertain the cause of the irritation and consequent turgidity of the gum tissue.

We need not look far for this cause. We can find it in the form of calculus, either salivary or serumal, that has been formed on the root and lies concealed beneath the gum. Such accretions can be found in all, or nearly all cases where the gum tissue has become inflamed at certain points without any outside or mechanical influence.

The belief that calculus is the prime cause of the movement of teeth in the cases now under consideration is strengthened by the fact that you will always find it on the side of the tooth opposite to the direction in which it is moving. This cannot well be demonstrated on teeth in the mouth, but it is easily noticeable on those that have been extracted. In the case illustrated in Fig. 5, each of the three irregular teeth moved in an outward and backward direction, and on the roots of each of them was found a formation of calculus at a point where the mesial and lingual surfaces joined. An examination of the central tooth in model 5, which is removable, will reveal this condition.

In all of the last three cases mentioned, as well as in numbers of others of like character, an accumulation of calculus was found upon the roots of one or both teeth adjoining the separation and always upon the side opposite to the direction in which the teeth has moved.

From what has been said and from the facts presented, we are justified, I think, in arriving at the following conclusions:

1st. Where teeth have become separated in the line of the arch, opportunity for such movement has been furnished by the extraction of one or more teeth; usually the first permanent molars.

- 2d. Where only a few teeth have moved out of position, and they are situated next to the tooth that has been extracted, their movement is due to an unexplained tendency on the part of teeth to change their position when circumstances favor it.
- 3d. Where interdental spaces occur at a distance from the point where teeth have been lost, they are caused by the gradual and continuous pressure of inflamed gum tissue, and such irritation is directly due to a deposit of calculus at some point upon the roots of the separated teeth.

Having thus considered the etiology of the condition, there remains for us still to devise some means for its correction or prevention.

As to its correction after it has progressed to any considerable degree, no method has as yet been devised, and considering the usual age of the patient when the worst forms of the condition are reached, added to the fact that the teeth are then often loose, it seems extremely probable that any effort to bring them back to their former positions and have them again grow firm would be unsuccessful.

Our efforts, for the present, at least, must be directed toward the prevention or the amelioration of the unfortunate condition.

To this end, when the first manifestations appear, the root of the moving teeth should be thoroughly explored for calcareous accretions, and the same removed, if found. The gums should then be treated by applications of such astringent and alterative remedies as are likely to restore the tissues to their normal conditions. The occlusion of the opposing teeth should also be carefully noticed, and, if found necessary, they should be reduced on their cutting edges; for undue contact may have been one of the minor causes of the condition in its earliest stages.

The best means of prevention, however, lies in the preservation of the full complement of teeth, thus avoiding, in most cases, the possibility of, as well as the inducement for lateral movement and the creation of spaces. For regulating and other purposes, certain teeth, especially the first permanent molars, are often ruthlessly sacrificed. In the effort to simplify a somewhat difficult case of regulating, teeth are often removed without a just conception of the harm that may afterward result from such action. One difficulty is gotten rid of, only to be followed somewhat later by a greater one, not so easily dealt with.

It is often best and even necessary to sacrifice one or more teeth to attain the most desirable results in regulating, but it should never be done hastily, thoughtlessly or without full consideration of the possible ill-results that may manifest themselves at some other point in the arch.

Reports of Society Meetings.

AMERICAN ACADEMY OF DENTAL SCIENCE.

The January meeting was held with the president, Dr. C. P. Wilson, in the chair.

The evening was devoted to the exhibition and explanation of new instruments and methods.

Dr. Clapp showed specimens of combination fillings of gold and amalgam as described in his paper published in the December Cosmos.

Dr. Fillebrown explained the use of McLean disks for sharpening, as described by Dr. McLean at the union meeting of the Connecticut Valley and Massachusetts Dental Societies, and reported in the December number of the Independent Practitioner.

Dr. Pond exhibited a set of forceps and read the following paper:

Mr. President and Members of the Academy—I am aware that extracting is not the important subject it once was, and that forceps do not receive as much attention as formerly; but as it is still sometimes necessary to extract teeth, and as the operation is many times attended with difficulties to the operator as well as to the patient, I should like to bring to your attention a set of forceps, which I think have some advantages over those in general use.

They are the results of many experiments, and while there are no very noticable changes in appearance, yet they differ radically from those usually sold.

There are ten pairs in all, and they are designed to extract all the teeth. There are but two patterns of handles. All the forceps for the upper teeth have straight handles; those for the lower teeth have the familiar curve adopted by most makers. The ends of the handles of the upper forceps are rolled over and rounded, forming a large, smooth surface to rest in the palm of the hand when in use.

In extracting they are intended to be held with the hand in front and above the handle; the rounded end of one handle in the palm of the hand and the other handle between the second and third fingers.

This position allows the operator to use all necessary force in pushing the beaks upward without allowing the forceps to slip through the hand. It also allows the wrist to be kept straight and the operator to stand in such a position that he can watch the tooth, even when exerting all his strength. In holding forceps

with the hand back of and under the handle, the tendency is for the forceps to slip through the hand on the least upward pressure, and the wrist is twisted into a position unfavorable to the use of force.

The wrist is also twisted when forceps with curved handles are used for extraction of upper teeth, and no doubt all of you have seen operators in using such forceps forced, when they applied much power, to straighten up, holding the patient's head between the arm and body, and thereby assuming such a position that it was absolutely impossible for them to see what they were doing.

The lower forceps are held with the thumb above and just back of the joint, and partially between the handles. Great downward pressure can be exerted when necessary; the thumb will assist in keeping the forceps open, and as the handles at this point are slightly rounded, there will be none of that disagreeable pinching of the thumb, when the beaks are closed, which doubtless you have all experienced. The joints of all the forceps are rounded. I consider this form much better than the square or octagon joint, as it is smoother to the lips and much less liable to nip the soft parts. It is also fully as strong, and being much smaller, a better chance is allowed to see into the mouth.

Great care has been taken to have the pins in the joints in the right positions, and they are much nearer the beaks in these forceps than in the older patterns. You will find many forceps with the fulcrum three inches from the beaks, and they will grasp a tooth with about as much force as you can with your fingers. Such forceps, unless you close the handles with great force, will rock on the tooth and surely break the crown, and the use of much power in keeping the handles closed will interfere with extracting. Besides, with the fulcrum at a great distance from the beaks, it is necessary to lengthen the handles considerably to gain power, and the hand is too far from the tooth, which is another disadvantage.

In forceps of English make, the pins are much nearer the beaks than in this set. They have great power; but my experience has led me to believe that the leverage is too great. As an English dentist once expressed it, they certainly extract a great many crowns.

One of the greatest improvements in these forceps is in the shapes of the beaks. They will fit the teeth for which they are intended. Forceps may be made to crush crowns like a nutcracker, or to cut them off like cutting pliers, and many in the dental depots are constructed on one or the other of these principles.

You can go into any dental depot to-day, and find forceps intended for the upper molars with the beaks parallel, and you all know how seldom you find an upper molar with the palatal and buccal walls parallel. Such things show conclusively how little care is exercised by the buyer or seller, and is certainly evidence of great carelessness on the part of dentists.

One of the largest forcep makers in this country said in regard to this matter: "I know better than to make forceps as I do; but the managers and clerks of the depots don't know, and accept anything that is well finished, and some one buys them; and as I am paid by the piece, I can make more money by making them in this way." Not a very creditable statement to be made for the maker; but one that shows his opinion of the skill and knowledge exercised by us in the matter.

The shapes of the beaks of these forceps were determined by filling the blanks with wax, and closing them upon the crowns of the teeth for which they were intended. Repeated trials gave a typical shape, to which the beaks were cut.

There are no serrations in the beaks, as they are practically useless, and weaken the beaks to such an extent that it is necessary to make them much thicker than when no serrations are cut.

You will also notice that these beaks are thinned just at the tips, to allow them to slip under the gums without cutting. The upper molar forceps may look somewhat one-sided, but they fit the teeth; and the forceps for the upper front teeth have one beak (the outer) wider than the other, to conform to the shape of those teeth, which is quite an advantage, and a point that was entirely overlooked by most makers, and, in fact, is now. The forcep for the lower third molar has a long, small joint and small beak, which enables the operator to reach that tooth when there is very little room, and with it you can succeed many times when it is impossible to reach the tooth with ordinary forceps.

Many of the points to which I have called your attention are trifling, I know; but as attention to trifles makes perfection, so attention to details is necessary to produce good forceps.

At the present time there is great carelessness or ignorance shown in the manufacture of forceps, which, perhaps, is to be expected, and that which directly concerns us, carelessness in buying and using. Many students buy their forceps before they have any idea of extracting, and continue to use the same set in practice. No operator is so skillful that he does not need good instruments. His great skill may enable him to succeed with poor instruments,

but he would attain better results with good ones. Poor forceps are responsible for much of the poor extracting, and poor extracting is by no means uncommon in spite of the advance of our specialty.

Anything that is worth doing is worth doing well, and if we are going to extract, let us know what points we wish embodied in our forceps and see that we have them. Be more careful and exacting in what we buy, and the makers will be forced to improve. Do not depend upon them, and take anything they recommend and assure us is just right. They do not and should not know what is best. Most of them know nothing whatever about extracting; and although some claim to have competent dentists engaged to examine all of their products, and on that ground almost refuse suggestions, the results do not show evidence of great thought or knowledge.

The dentist should be the judge, and should exercise his judgment in such a way that poor extracting, due to poor forceps, should be a thing of the past; and many of the patterns of forceps which now have a large sale would find their proper place in the old junk, much to the relief of suffering humanity.

Dr. Ham—I like Dr. Pond's forceps very much, and can suggest one thing which I think would be an improvement, that is to have the sharp edges of the joints beveled. I formerly had trouble, as I presume many of you may have had, with forceps cutting the lips when extracting, and I remedied it by beveling the joints of my forceps. I hear the suggestion that a napkin can be used over the lips; but that is open to the same objection as large joints—it obstructs the view.

Dr. Loveland—I have here a gum-cutter, which I have designed to use in cases of difficult or painful eruption of the third molar. It is not a perfect instrument, and is exhibited in the hope that some one may take the ideas and develop them. I find difficulty in using the rotary cutters in the back of the mouth, and the guillotine will not cut through thick or tough tissues.

This cutter resembles a pair of forceps or pliers with the ends of the jaws rounded. The lower one smooth and thin, to slip under the piece of gum to be removed; and the upper one thicker, and having fastened around its outer edge a very thin, steel knife. When the handles are closed the knife on the upper jaw is forced against the smooth lower jaw in the same manner as in a punch for perforating leather. It works very nicely, and will remove a piece of the gum with a smooth, clean cut.

Dr. Wilson—Gentlemen: I desire to show a new saw frame which I have designed. The long handle, covered with hard rubber, makes it easy to manipulate; then, again, different lengths of saws can be used. When the saws are adjusted, and the screw at the end of the handle tightened, it is impossible for them to move. I will pass around different saws I used with this frame. You will notice they are of different lengths and thicknesses. The very thin, paper-like saws are very useful in trimming down cement filling between teeth that are close together.

I also desire to show a new mirror frame. This frame is somewhat similar to other split frame mirrors, with the exception of its being much lighter and less bulky. The screw that joins the handle to the frame proper is high up in the handle, where there is plenty of room for it. In setting a new glass I place an instrument in the yoke of the frame, and spring it open sufficiently to let the mirror drop out.

Dr. Hopkins—I should like to call your attention to a napkin holder patterned after one made by the late Dr. Tucker. It is an ancient appliance worthy of being modernized, and is almost indispensible in those difficult cases beyond the use of the rubber dam. It is made of German silver wire, so shaped as to include all the teeth on one side of the lower jaw in a way to closely press the folded napkin against the gums excluding the saliva, and is held in position by a handle in the hands of the patient.

Dr. Codman—I have had some cases recently where it was desirable to keep a tooth dry for some time after filling and have devised the following method. By its use you can do away with the disagreeable mouthful of rubber dam, and allow your patient to sit comfortably in a chair and read, while you attend to others; or you can operate on other teeth in the same mouth.

The rubber dam is applied and tied as usual; after finishing the filling or whatever is to be done, the dam is gathered over the crown of the tooth and tied tightly with a ligature as close to the tooth as possible. The dam above the ligature is cut away and you have your tooth in a tight rubber bag and can keep it there as long as you wish, with very little discomfort to your patient.

Dr. Preston—I have a method of extracting badly decayed roots, difficult to grasp with forceps, which I will endeavor to explain. With the engine drill a hole in the root as for a pivot. Take a common wood screw, such as carpenters use, of a proper size and with a file flatten it on four sides making a tap. With this tap cut a thread in the root; then take a similar screw, not

flattened, and screw it into the thread cut into the root with a small screw-driver or pliers. Extract the root by taking hold of the screw with forceps. It is not necessary to cut the gums, and the worst roots can be removed without even scratching the surrounding tissue.

Dr. Fillebrown—I have lately been using creolin as a substitute for carbolic acid, for washing instruments and for general disinfecting purposes, and as a surgical dressing. I like it very much, as it is free from the disagreeable odor of the acid and is not poisonous. I am now using creolin gauze as a dressing for an antrum upon which I operated lately, curetting a large patch of pyogenic membrane from the under surface of the infra-orbital plate. It keeps the wound perfectly antiseptic and free from odor. It is used extensively throughout Continental Europe.

Creolin is a by-product in the manufacture of carbolic acid. It is produced by the addition of resin and soda to the creasote after removal from the latter of all carbolic acid.

It forms a dark-brown, syrupy fluid, with a peculiar odor, somewhat resembling tar. Its taste is at first aromatic, and at last burning.

It is readily soluble in alcohol and ether. With water it is insoluble, but is suspended in the form of emulsion, producing an opaque milky appearance. The most complete emulsion possible is two and one-half per cent.

Creolin belongs to the most powerful antiseptics and disinfectants. As a deodorizer it is unsurpassable. It has hæmostatic properties and promotes granulations. It is non-irritating, and internally is non-poisonous. It is used in form of gauze, ointment, soap or emulsion.

Subject passed.

V. C. POND, Recording Secretary.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

TENTH ANNIVERSARY MEETING.

The Tenth Anniversary of the Odontological Society of Pennsylvania was held at Association Hall, Philadelphia, Dec. 12th and 13th, 1888.

Wednesday, December 12th.

The meeting was called to order at 2.30 P. M., by the President, Dr. Edward C. Kirk.

Prayer by Wayland Hoyt, D.D.

An address of welcome was made by Prof. Charles J. Essig, of Philadelphia, one of the charter members of the society.

Gentlemen:—It becomes my duty, as it is my great pleasure, to extend to the guests of the Odontological Society of Pennsylvania, a sincere welcome.

It seems fitting that we should thus celebrate the tenth anniversary of this society for the importance of the work of a decade of activity and usefulness, of such an organization, cannot well be overestimated.

To say that it is an occasion for congratulation would but feebly express the sentiments of those who have watched its growth from its foundation.

Inaugurated at a period that marked a distinct impulse in dental affairs, it did not escape the opposition that usually greets such enterprises; but its ten years of successful growth abundantly show that at its organization it met an existing want.

A society like the Odontological is a vehicle by which, through the reading of valuable papers, discussions, criticisms, clinics and demonstrations, a large amount of practical information reaches the profession at large.

The progress of dental art and science would of course be more rapid, if it were possible for us at a glance to recognize and separate the merely speculative from the practical; but amongst the methods and theories brought before our societies at their monthly meetings, the two are often nearly equally represented.

"It has ever been the practice of mankind to let the wheat and the tares grow, and bring forth their fruit together," and it is a healthy sign when men organize, and meet regularly for the purpose of garnering the one and rejecting the other, or stirred by a zeal to be of use in their day and generation, to freely impart the knowledge and experience which comes to them in their professional duties.

It emphasizes the difference between the past and the present, for the fraternal instinct, which leads men to seek intercourse of this kind and with this object, did not exist in the early days of our calling, or else it was held in abeyance by less worthy motives.

Free interchange of ideas and publicity, such as are afforded by the societies on the one hand, and the dental journals on the other, are essential to the development of a specialty, which draws from the arts and sciences, whatever in the practice of its various branches it finds useful. In the earlier days of dentistry, valuable discoveries must have been made many times, without the profession acquiring thereby any new fact.

Indeed we are often reminded of the disposition of "those old fellows," "to steal our modern ideas," when some young member, consumed by a desire to achieve fame, describes his latest discovery, only to find that it had been done perhaps before he was born. Indeed, there is hardly a method of recent adoption of which this cannot be said. It is true of both bridge work and implantation, the two most important of the recent contributions to dentistry.

To prevent new discoveries from being either lost or too frequently invented, there must be just such a combination of favorable circumstances, as we have in our societies and journals.

Among the members of our profession will be found some of an inventive turn, and we may also have others equally useful though perhaps less praiseworthy, whom we shall designate as appropriators, and while we have not asked our visiting brethren here because, "having found out pretty thoroughly what each other knows," we want other fields and pastures new, yet Philadelphia has long been distinguished by extraordinary activity, in discovering the value of novel methods and appliances, so that I can assure you that anything new exhibited here will not be "wasted on the desert air."

But be this as it may, the fact remains that no matter in what way the new theory, device or fact, gets before the society, it becomes through its agency the property of the professional world, and humanity is benefitted thereby.

There are other directions besides the discussion of methods or scientific problems, and the general aim of preventing the intrusion of unsubstantial theories, in which our dental societies can be of great use. Their fundamental object being the general good of the profession, it would seem perfectly proper, and in keeping with its legitimate function to scrutinize the present system of dental education, providing it does so impartially and without fear or favor. It would not be true to its own interests, if it did not feel dissatisfied with any system which does not give promise of the highest possible attainment.

But, gentlemen, these are thoughts that naturally present themselves to one whose pleasant duty it is to open this anniversary session, with a cordial greeting to our guests who have joined us in the celebration of a decade of our existence, devoted to the interests of the profession to which we owe allegiance. I presume the honor of extending a formal greeting to you fell to my lot, because I am not supposed to be given to lengthy speeches; indeed the large number of essays, discussions, and incidental work which will come before the society, forbid such encroachment upon the time, short enough at best, which has been reserved for the purpose.

Let us endeavor to make this meeting one of pleasure, as it surely must be in the opportunity to social intercoure which it offers, and of profit in the evidences of professional advancement which will doubltess be exhibited here, that our guests may carry home with them pleasant memories of the 12th and 13th of December, 1888.

Dr. A. L. Northrop, New York, made a very happy extemporaneous response but which, on account of the absence of the reporter, was not obtained.

Evening Session, 8 o'clock, P. M.

Lantern exhibit, illustrating Dental Histology and Pathology, by Drs. R. R. Andrews, Geo S. Allen, and W. X. Sudduth.

Dr. Andrews presented the subject of the development of the teeth, dwelling upon the formation of calco-globulin.

Dr. Allan showed photo-micrographs of artificial and natural decay, and the micro-organisms causing the destruction of tooth-substance.

Dr. Sudduth illustrated the subject of inflammation in non-vascular tissues, using photographs of a large number of specimens of pathological ivory.

DISCUSSION ON DR. ALLAN'S PAPER ON DENTAL CARIES READ AT THE AFTERNOON SESSION, AND THE EXHIBIT OF THE EVENING.

Dr. W. A. Atkinson, New York City—I rejoice in the progress that has been made; but my joy is taken away when I see assumption of wisdom take the place of facts. It is difficult to speak of the specimens, for there are only a few in an audience like this who are acquainted with them. Those who have never done this work and developed such specimens are unable to know from the screen the beauty and excellence of the work, even when it is well presented. The weakness of mankind is to pronounce matters as finalities when their investigations have not fully settled the subject. If we but hold ourselves within limitations of what we do see and know, and discriminate against that which is uncertain, we would make more sound progress.

Now it was said by Dr. Sudduth that there was no blood in the cornea. There is more blood than named in text books. He also said that the lymph spaces in the cornea under the inflammatory process became enlarged, until red blood corpuseles could pass into them and give the appearance so often seen in conjunctivitis. How do they get into the lymph spaces? Do they come from the main tract or from a capillary? I put this to persons who want to get at the solid truth with regard to inflammatory action.

To go back to the time when the specimen first shown, the left superior lateral incisor with a depression on its lingual surface and a small cavity in the emamel was cut, from that time I know George S. Allen has done excellent work. He cut that for me in Cleveland, O., about 1855 or 1856. We have grown a good deal in our work, but we stand exactly where Richard Owen stood, producing appearances that we cannot interpret. I want to develop that sort of investigation that knows no compromise until the truth is revealed.

Dr. C. N. Pierce, Phila .- So fully am I in accord with the paper read by Dr. Allan, that I have little pleasure in any effort I may make to criticise it. But a remark made by him and repeated by Dr. Sudduth seems to leave an impression upon the audience which I would like to modify. The non-vascular condition of the dentine is spoken of so positively that its organic matter and circulating system is quite ignored, yet simple experiments will test the prominence of both. A tooth placed in chromic or other acid for but a limited time becomes decalcified, and consequently flexible; this, the organic element of the tooth which is left, maintains much of its original contour though minus its original density, from the loss of its lime salts. A freshly extracted tooth, weighed and then thoroughly dried, will have been found to have lost perceptibly in weight, and on being again immersed in a liquid much of this is regained. This experiment tests quite satisfactorily the permeability of this dense tissue, and again the changes which take place in the color of the teeth, both physiologically and pathologically in their nature, are still further evidence of its possibilities in this direction. If these organs are so readily permeated by a fluid, then why not their vitality, sensibility and density, all be more or less under the influence of a vital fluid furnished by or emanating from the vessels in the pulp and peridental membrane, vascular tissues which hold the teeth in close connection with the arterial and nervous system. Does not every skilled operator recognize the varying sensibility of the dental tissues under different systemic conditions? Does he not also recognize a difference in density at different ages? While the language or tests of the books justify the expression, "non-vascularity of the dental tissues," yet accurately or critically speaking, it is in my judgment quite incorrect, and for the reason above illustrated that we much recognize vital and physiological changes which are constantly taking place during the life of the tooth. I know this has been doubted by some most excellent observers, but the evidence in my judgment is against them. In this most valuable paper Dr. Allan has given us beautiful illustrations of the etiology of dental caries, and in doing so has displayed influence or function of certain forms of bacteria. Now, while we recognize the harmful influence of these, and their essential presence in the progress of dental caries, we at the same time should not forget that there are innumerable other living forms or organisms in the oral cavity which are not only not harmful, but benign. They are mess-mates and not parasites in any sense of the term; among these are the lepthorthinx buccalis. Where there is pabulum organism will fine a habitat, and their multiplication and influence varies with their protection and food. When I think of the labor and expense bestowed by Drs. Allan, Andrews, and Sudduth in the preparation of these papers and specimens or illustrations—of the months and years of thorough and earnest effort, and of the result in illustrating so clearly the origin and the development of the teeth through their various progressive stages, from the simple homogeneous structure to the complex and heterogeneous one-I am proud that I am a dentist, and firm am I in my conviction that there is a future for dentistry; that we have as yet seen but the beginning, what is being but prophetic of what is to come.

But, Mr. Chairman, what is most sorrowful is that in spite of or in the face of all these beautiful illustrations in published textbooks, we meet with statements long since exploded, statements begotten in ignorance and repeated and republished in the selfsatisfied insufficiency of the author.

In this evening's work I have but one regret, and that is that with such opportunities for knowledge there should be standing room for another dentist in this house.

Dr. R. R. Andrews, Cambridge, Mass.—There are one or two points I would like to speak of, and although I shall have to differ somewhat from some here, I do so because I have reason for it.

Some years ago, there occurred here in Philadelphia a very pleasant meeting of a few who were interested in histology. I think

Drs. Black, Darby, Sudduth and Williams, among others, were in the room. I mentioned at that time the case of a tooth that came to me very frail, which I had filled with the old oxychloride of zinc, and in the course of two years I found instead of frail dentine it had become very hard. The tooth was entirely changed. I was much surprised to have Prof. Black tell me that there was no change in the structure of the dentine of the tooth. I know that the tooth was originally so soft that I could scrape off its substance with an excavator. The tooth was afterwards filled with gold, and Dr. Black told me at the time that if I should make a section of the tooth I should find that the tubuli were not calcified, but were filled with fatty globules.

We see superficial caries that have been stopped entirely in teeth of the first quality. There is a cavity, black or brown, that has been arrested by the reparatory action of the dentine. The color has been given by dead micro-organisms. I believe decay is arrested by some reparative action of the pulp. Instead of fat globules being found there, they are really globules of calcospherites, a first product of calcification. These tiny globules have been carried by some process into the tubuli of the dentine, and because of the life centre, the pulp, being so far from the periphery, it has not been able to carry out its full function.

I believe that in teeth of the first quality, where the decay has been stopped by natural processes, it has been stopped by the calcospherites being carried to the point of decay or injury, and resisting the attack of decay, perhaps the partial, if not full calcification of the tubuli at that point.

I think it is possible we may find in time that the white zone between the micro-organisms and the healthy dentine may not be partially decalcified, but may be a zone of resistance, I am by no means sure of this. Now, they say that the white zone may be seen in artificially produced decay. I have seen a few of Dr. Miller's specimens, but have never seen this softened zone. He places a piece of tooth into a culture, but the micro-organisms attack it from all directions, and I do not think that we can come to any positive conclusions that there is a white zone there.

There is certainly a certain amount of circulation through the tooth. There can be no doubt about it. It is not the same circulation as blood circulation, but there is a fluid and a certain circulation.

Dr. W. H. Dwinelle, New York City—Will not our memory, referring to the past, help us out of this difficulty? We know that teeth have had the dentine injected until they were quite red, after

a severe accident, showing that under heavy pressure the blood corpuscles become broken down. We know the diameter of a blood corpuscle is about 3000 of an inch, whereas the diameter of the tubuli are about 10000, so that blood corpuscles could not enter into the tubuli. That being the case, the theory in olden times was, when endeavoring to account for the teeth becoming red, that the blood corpuscles were broken down, and became so fluid that it was capable of carrying its coloring matter with it. That was an old theory, and if it is a good one I do not see why it will not help us out on this question.

Dr. James Truman, Phila.—I was surprised to hear Dr. Sudduth make the statement that no dentine was formed except upon the odontoblastic layer. I question whether this assertion can be sustained, as it seems to me in conflict with known facts. There are several forms of dentine that by their development seem to antagonize the opinion that the formation of dentine is confined to the peripheral border of the pulp. The tubes in senile dentine are closed with a secondary formation, and are rendered translucent. In teeth thrown out of the jaw in earlier life the same appearance is frequently presented, the dentine exhibiting a perfectly transparent appearance, with an entire obliteration of the parietes of the tubes. Now what is the explanation of this? Moderate irritation will produce extra development of tissue, or, as I choose to formulate it, slight irritation produces extra development; excessive irritation, destruction. This is perfectly illustrated in the abrasion of the cutting edges of the anterior teeth. In slow caries the conditions for reformation are always present, and the transparent zone, in my opinion, is the result. The investigations of Wedl, Miller and others do not seem to me to give satisfactory results.

Dr. G. S. Allan, New York City—In reference to the point made by Dr. Pierce, I think we only differ on terms. It is quite difficult to make use of a definition that all understand alike. I think I agree with Dr. Pierce, and in the main also agree with Dr. Sudduth.

As to what Dr. Truman says about old teeth and secondary dentine, I will say that as far as I can understand the observations of Drs. Miller, Black and Sudduth, and from my own observations upon many teeth sections which I have in my cabinet, I do not believe that the tubules do become filled up with secondary dentine. I think Dr. Sudduth's explanation, while in the main theoretical, offers a very satisfactory solution to the question as to how the

teeth change in character, appearance, and physical characteristics from youth to age, without the necessity of saying that there is an extra calcification. The filling up of the terminal ends of the dental tubules and canaliculi with a deposit of secondary dentine—granting such to be the case, would not, it seems to me, account for that extra hardness. There is not enough space in the tubuli to warrant that their filling up alone would account for this extra hardness and extra resistance to the instrument in cutting it.

I have quite a number of sections of teeth of old age, and one I will call attention to in closing. It is a section of a molar tooth from a person 60 years old. The section was made through the filling, and the tooth and the filling is shown in situ. It is an amalgam filling. There is no question in examining that tooth, that the tubules are all open, because where the presence of the mercury in the tubules is not evident, the presence of air is perfectly plain to be seen; that section I have in my possession, and to my mind it proves conclusively that the dental tubules do not become filled with a calcific deposit.

Subject passed.

DISCUSSION ON DR. PERRY'S PAPER ON THE TREATMENT OF PROXIMATE SURFACES.

Dr. W. H. Dwinelle, New York City--Certainly there is no one present who would desire the paper just read to be one sentence shorter. All familiar with my professional life know I have always advocated contour filling. We have simply fallen into the reasonable conclusion that Almighty God is the source of infinite wisdom, and when we mangle, deface or destroy these beautiful creations of his hand we take a step, at least, downward.

To be endorsed, as I have been so cordially on principles I advocated between thirty and forty years ago, is such a source of delight and comfort to me, and is such a complete fruition of my earlier hopes, that I am almost constrained to exclaim with the psalmist: "Now let thy servant depart in peace." The reason for contouring is patent to us all. The teeth should be restored to their pristine contour by bringing them to their largest circumference or diameter, so that they impinge at that point; and one reason for it is to prevent food from crowding up between the surfaces, as it otherwise would press upon the gums, to their injury. This is obviated by the teeth touching at their largest circumference like a row of oranges in contact. If this is not done, the

teeth are often liable to leave their place in the arch, or retreat from their normal position.

The objection has been made to contour fillings in that we are not skillful enough to establish a perfect closure or joint at the cervical margin. Let us be more skillful, then. I can show you contour fillings I built up as far back as 1854; have seen them within a few days, and they are as perfect as if the operations were performed yesterday. The cervical point is where the greatest skill is necessary, for if it is imperfectly closed you will find it necessary to either remove the filling entire, or perform a very difficult operation to correct the mistake; failing here, you fail in everything.

In a treatise on crystal gold, which I published in the American Journal of Dental Science in 1855, I think all the arguments I could present at this time were presented then. I am not a prophet, but I have been congratulating myself that at that time I was inspired by something like the spirit of prophecy. I then advocated the restoration of the entire crowns of the teeth—molars as well as the rest—and this before the day of the rubber dam, too. How I succeeded is now a wonder to me. I used napkins, and had progressed so far in my system that I could stop off the flow from the buccal and sublingual ducts entirely. I made little tongs out of silver wire, with which I grasped the mouths of the ducts. I was able, by the use of these appliances, in conjunction with napkins, to stay off the flow of the saliva, so that when I took off the napkins I sometimes brought portions of the mucous membrane with them.

The dental engine is one of our greatest blessings, and yet I think it is doing a great deal of injury to the coming generation of our profession. A few years ago I read an article on the "Good and Bad of a Dental Engine." In the use of this appliance we lose the delicacy of touch and manipulation of the fingers so essential to the best work. Dr. Perry has incidentally alluded to it, and given you the note of warning, when he says that a young student, or rather young practitioner, is apt to lay aside the old instruments in excavating cavities and resort entirely to the engine. I am in hopes we shall reform in this respect.

Dr. Chupein, Philadelphia—Some eight or nine years ago, Prof. Flagg read a paper before the Odontological Society of New York, in which he made the following remark, relative to the two modes of operating on the teeth which were in vogue at that time: "' The Separationists' may be likened to the A B C of the profes-

sion, as Arthur, Bonwill, Chupein; while 'the Contourists' embrace the whole alphabet from A to W—Atkinson and Webb."

Now, while I was classed among the former division, I worked then in all earnestness, and endeavored with all the ability of which I was capable to save the teeth of those who sought my services. In some classes of teeth, and in some positions of decay, the permanent separation of the teeth is feasible: as, for instance, in those positions where the decay has not encroached high up on the neck of the teeth, where the enamel is thin, and where it is possible to obtain a firm point of contact. When I read the earnest protests of the Contourists against separation, and was fain to admit their strong argument in favor of their plan-viz., the taking of nature for a guide, and of restoring by art the shape of the tooth, which was ruined by excessive decay—I thought to myself, "Is it possible that the Contourists can be right, and I, with all the thought I have given to this subject, wrong?" I knew that my efforts had been in earnest, and that I had endeavored to do the best I knew how for the patients who employed me; but I am free to confess, after years of experience, that, in the very large majority of-cases, the contour plan is the correct one, and I beg to be here recorded as one who has seen the wisdom of it.

Dr. Kingsbury, Philadelphia.—I want to express my hearty endorsement of the paper before us, one of the fullest and most satisfactory papers in my estimation on the subject that it has been my good fortune to listen to, compared with some of the older men of the profession who are present with us to-day, I can but regard myself as quite a young man, a mere student in dental practice. Drs. Atkinson and Dwinelle will leave a rich legacy to the dental profession of America and the world. I was somewhat surprised at the decided and strong position taken by Dr. Arthur some years ago in his practice of filing and leaving such wide spaces between the teeth, yet many of our best practitioners adopted his method, and with others I was led to believe it most beneficial in many cases for the preservation of the natural teeth. While there may be arguments adduced in favor of Dr. Arthur's method of practice, I have long since come to fully recognize the demerits and to practice the other method, that of contour fillings, and this is my present mode of operating in a large proportion of my fillings. Owing to a lack of skill or proper care in packing gold in approximal cavities near the margin of the gum, numerous failures it must be admitted have occurred, and this fact has given rise to one of the strongest arguments in favor of Dr. Arthur's method of filling teeth

in such cases. I am of the opinion that in special forms of teeth a marked separation will sometimes better conserve their preservation.

Dr. S. H. Guilford, Philadelphia—I am in perfect accord with the sentiments expressed in the paper, and it seems to me that the day of permanent separation of the teeth has gone by. Almost everyone now believes that the best plan of treating these teeth is to separate them well, remove all the decay and weak portions of the teeth; fill thoroughly with gold, contour them, finish well, and then allow them to approximate again.

In order that contour work may be properly done, several things are necessary. First, we must have a sufficiency of room, space in which to operate, and that space is made in one of two ways, either by gradual pressure or by immediate separation at the time of the sitting. For my part, in a majority of cases, I advise immediate separation. It can be done with little or no pain. Before I undertook to use the separator I was somewhat in doubt as to how my patients would like it. I thought there would be a great deal of pain, but I found that was not necessarily so if due care was exercised. I frequently find in making temporary separations, especially for children, that whatever we place between the teeth is liable to be displaced. By means of separators we avoid this, and there is no soreness following the operation.

Varney and Webb could build up gold so as to restore the natural form of the tooth, but the great majority of us are not so skillful as that; consequently, if we can get the aid of some mechanical device we are much benefited.

Dr. Perry spoke well regarding matrices. They play an important part in certain work, and a practitioner to be always ready should have matrices of all the different kinds, for all will come into place on some occasion. One objection urged against their use is that they limit the space for operating and make it difficult to fill the margins perfectly at the cervical wall or lateral border. With regard to limiting space, this is true; but it is no serious objection, and in regard to margins, that depends upon the style of matrix used and the manner of adjusting it. I have always held that the proper matrix to use is one that is slightly flexible, so that when placing gold against the wall, the matrix will yield slightly and allow the gold to go a little beyond the line of contour. The same is true in regard to the cervical margin.

Not a little advantage in the use of the matrix is the little time that is required for trimming after the filling is inserted. Good results can be obtained by the use of matrices in the packing of cylinders, mats, etc., at the cervical border, by having them a little longer than the cavity is deep. Then by placing them against the pulp wall and leaving the other end free to tuck in between the matrix and the edge of the tooth, we hold the first or foundation cylinders perfectly in place, and can mallet them well down and secure perfect marginal contact. When this is done perfectly, having a matrix that is a little elastic, there is no difficulty about obtaining satisfactory results. It requires a little care and skill, but we get better results than we could obtain in any other way.

Regarding the separation of the teeth, I had a little child brought to me a few weeks ago that had some temporary fillings placed between the superior incisors and laterals that had been there since early in the summer. The dentist had separated the teeth and then packed gutta-percha in the spaces to keep the teeth apart. The material pressing upon the gum had also made it very sore. The excessive separation of the teeth had forced the lateral underneath the cuspid that was coming in. In separating teeth for filling we should not have them separated any length of time, for I have seen cases, as Dr. Perry mentioned, where teeth have not returned to their former position for a long time, and sometimes never.

In regard to the dental engine, Dr. Pierce spoke rather discouragingly of its use by beginners. It possesses the possibility of both good and evil. Students must be taught to use it carefully. I agree with Dr. Pierce that it would be a good thing if the dental engine was not used by students until they had spent some time in college. I have always urged students to do without it the first year so as to acquire some dexterity in manipulation, after which they will better understand how to use and control the engine.

Dr. J. N. Crouse, Chicago.—I wish to endorse in toto the principles laid down in the paper on contour work. We have now the separators which aid us very much in securing space while we are working, and there is very little excuse for fillings not being contoured for the protection of the gum, the comfort of the patient and the advancement of the operator.

I know that good fillings can be made with sponge gold, but have substituted heavy foil instead, which fills a place for me nothing else can.

I took strong grounds against Dr. Arthur's method when his book came out in favor of contouring, but after condemning it, and seeing others going into separating, I was dragged away from my firm resolution for a little while, but went back to it, being satis-

fied that contouring gave the very highest results and is true artistic dentistry, affording the greatest amount of comfort to the patient as a masticating apparatus, but requiring a great deal of good judgment, skill and energetic labor.

Dr. W. H. Dwinelle, New York City—I always stand up for crystal gold. I may surprise many present when I say that crystal gold is the author of contour filling. It was because of the adhesive principle in crystal gold that contour fillings were made possible. Dr. Watts and myself were the first to discover that absolute gold contained in itself an inherent principle of adhesiveness, and hence the possibility of building gold up in an independent and consolidated form.

I refer to my treatise of "Crystal Gold," published in 1855. In it I advocated the contouring of teeth with gold, and demonstrated it by practical illustrations of actual work. My statements were deemed so extravagant that I was ridiculed and dubbed the Munchausen of the profession. Now some of those who were the most zealous in condemning my system and its possibilities claim to have originated it themselves. At that time I claimed that I originated the system of contouring teeth to their normal forms, and stated that I was willing to give a thousand dollars to any one who would bring proof to the contrary. I respect the offer to-day.

Absolute gold being adhesive, it becomes plastic in our hands; and from this standard of purity, by admixture of slight alloys, we are enabled to make foils cohesive, semi-cohesive and soft or non-cohesive.

Subject passed.

DISCUSSION ON DR. GUILFORD'S PAPER ON VOLUNTARY TOOTH MOVEMENT RESULTING IN EXCESSIVE INTERDENTAL SPACES.

Dr. W. A. Atkinson, New York City—I admire the lecturer for the charm of his ideas and the perspicuity of his expression; that was a case of pyorrhea alveolaris. He said it was difficult to understand how that tooth moved from the place when it was tied. As to knowing the cause and how to get at it, he smeared it over without the clear analytical discrimination he is capable of exercising.

A patient came to me awhile ago suffering with one of worst cases of pyorrhœa alveolaris I ever saw, without the loss of a tooth, who told me she had not eaten a single comfortable meal in six years. With waxed floss silk the teeth were tied in their proper relations; they were so loose they had to be held carefully in ad-

justing silk. The right inferior molar had its anterior root two-thirds absorbed, was very loose and probably there was some absorption on the posterior root. I would not extract it because I wanted it to tie to, that each tooth should stand according to a perfect occlusion affected by the use of corundum wheels, I did not attempt to remove all of the lime at that time. Bibulous paper was placed around the pockets and aromatic sulphuric acid injected until the pockets would not drink any more. You could see it flowing into the depths of the sockets. It does not remain in sight very long. Bibulous packs of several folds, smeared with a paste of tannin and glycerine, were placed to prevent the acid from touching the mucous membrame in the mouth. Repeat above and below; above it will be capillarity that will help us; and below we will have gravity too; with a good delicate syringe introduce drops into the pockets until they are full.

That lady came the next day and said: "I have eaten the first meal comfortably in six years."

Dr. James Truman, Phila.—I cannot agree with Dr. Atkinson that a case of the kind described is always necessarily pyorrhea alveolaris. It is well known that calcarious deposits will remain for long periods of time without producing this pathological condition; indeed, I hold that pyorrhea is not possible with salivary calculus adherent to the teeth. If this were a producing cause, then would the inferior incisors be rarely free from this disease.

In regard to the interdental spaces described by Dr. Guilford, there is no question but that a great wrong is done in the extraction of some teeth, especially the first molars. When these interdental spaces occur, and it must be exceptionable when they do not, an irregularity is produced almost impossible to regulate. What is needed is to understand that all teeth are important and to be preserved; in a word, that extraction is the very last thing to be done.

Dr. S. H. Guilford, Philadelphia—I will state that the word "voluntary" was used for want of a better term. Regarding what Dr. Atkinson has said about the formation of pus, it seems to me that if pus had been there (and pyorrhea means pus), there would have been evidence of it in ten years' time. In all of those cases mentioned to-day and others, I have never found any evidence of pyorrhea. The inflammation has not extended to suppuration. In regard to a pocket being there, the only pocket we find is caused by the separation of the pericemental membrane from the root, and this is apt to favor the secretion of tartar.

Dr. Atkinson—What sort of tissue did you go through when you came to those pockets?

Dr. Guilford—No tissue at all; I passed beneath the dental ligaments.

Dr. Atkinson—That ligament was gone long before.

Dr. Isenbrey—Had these teeth ever been separated to bring them apart? Very often, in my opinion, injudicious separation of the teeth starts that condition of affairs.

Dr. Guilford-They had not.

Dr. Atkinson—There was from your description of it. The lime does not deposit in connective tissues. There is a little pocket for the lime salts to crystallize in. These are artificial pockets made by a break or fracture of the tissue, so I supposed from your own description you tried to take out that.

Dr. Guilford—One of these cases was followed for ten years and yet no pus was discovered.

Dr. Atkinson—So was the case I mentioned. The alveolar wall was destroyed so that the gum only hugged the teeth above the necks. Upon proper examination by putting a little cotton in between them, pus corpuscles and microbes in abundance were found.

Dr. Sudduth—We only have pus where there is suppuration.

Dr. Atkinson—(Interrupting), I said separation.

Dr. Sudduth—I did not say that you said suppuration; you, however, did say that it was a case of pyorrhœa alveolaris, which name is only given to that stage of the catarrhal condition that attacks the gums and alveolar process when it has reached the suppurative stage. In regard to the movements of teeth in these positions there can be no question but that they do change their position without any perceptible inflammatory condition; in proof of which, witness the deposits of lime salts—serumal secretions—which are deposited only when inflammation has not progressed very far. Serumal deposits result from a low grade of inflammation, in which case no pus is formed. These cases of Dr. Guilford's are not cases of pyorrhœa alveolaris.

Dr. Atkinson—Where do you understand that the space occupied by the consolidated lime salts to be, than except in a pocket in the tissue. Suppose you take the eye, for instance. Is there not a chasm there into which the inspirated lime salts go?

Dr. Sudduth—The lime salts are deposited in the inter-cellular protoplasm; there is no actual cavity.

Subject passed.

To be continued.

Editorial.

THE GERM THEORY.

We point with pleasure to the photogavure plate in this number of the Journal as an evidence of the marked advance that is being made in our facilities for demonstrating histological condi-So long as we had to depend upon drawings to represent the different expressions of tissues in health and disease, especially the latter, just so long did there exist the possibility of misinterpretation of the phenomena observed. The matter of personal bias and preconceived ideas of certain conditions were always to be guarded against; but now that we are able, by photomicrography and photogravure work, to reproduce the exact appearances to be found in tissues, either normal or diseased, the whole problem brings itself down to an interpretation of the actual conditions as represented in the negative or plate, by the mass of observers, and not by the individual, as heretofore. It seems to us that the present marks a step in advance, in that the profession at large is introduced into the mysteries of the laboratory through the eye of the camera, and is asked to form conclusions for itself, and not to depend upon the deductions of the single individual, even though he may be ever so painstaking and conscientious.

The evidences are before you, and you are at perfect liberty to draw your own conclusions. It has always been an enigma to us to understand why it was that the profession at large, both medical and dental, should have been so averse to accepting the germ theory of disease when it explained the hitherto unexplainable in many conditions pertaining to retrograde processes, we can only find an answer in a conservatism which has been born of excepting previous theories only to have to give them up in time. Conservatism is a good thing. It keeps us from running away after strange Gods, but conservatism never gave a new idea to the world. To make a real discovery or advance a new doctrine requires a radical.

The opposition to the germ theory grew out of a lack of knowledge of the basal principles that underlay the investigations being made, and the extremely difficult character of the work which prevented many from entering into the field as original investigators. Not wishing to be quiet on the subject, they found it easier to offer obstacles to advance than keep pace with the rapid strides made by those engaged in the work. Had more attention

been given to the rules laid down by Koch, regarding the evidence necessary to demonstrate the direct etiological character of any given microbe with a disease, there would have been less opposition from the first. Koch held that it was not only necessary to find a micro-organism as a constant accompaniment to a certain given disease, but that the finder must isolate, cultivate, innoculate and reproduce the disease. Nearly all the work that has been done in his famous laboratory has been done upon that basis; and now the French come in with a line of discoveries relating to the alkaloids produced by certain forms of germ life. The result of their discoveries adds an additional proof to the direct connection of germs to those diseases that have thus been investigated, and puts to rest the long disputed question as to whether the micro-organisms were the cause or effect or diseased conditions.

Breiger has studied fully the ptomaines of peptones, putrescent meats and cheese; Debierre, the infectious diseases; and Bouchard, the products of the uropætic system. It has been conclusively proven that pathogenic micro-organisms produce, not only toxic alkaloids, but that in a few instances, leucomaines, also, which products act deleteriously upon the system. must now draw a distinction between infection and toxemia. Infection means the penetration into the system of some living principle which has the power of self-multiplication, while toxemia refers to the condition produced by the product of these living organisms. Ptomaines are the waste products of life and are not equally poisonous to all life, and while the waste product of the germs that produce decay is not, in the strict sense of the word, a ptomaine, because not being toxic in character, yet it is decidedly deleterious in its action on tooth substance. Dr. Miller, in determining the character of the agent, lactic acid, produced by the germs causing decay, was in the front rank in the line of chemical investigations that have since led to such satisfactory results. To conclude, any one to establish his claim as the discoverer of the germ that produces a certain disease, must first prove that the germ is the constant accompaniment of the diseased condition, must cultivate, isolate, innoculate and reproduce the disease and then determine the character of the toxic element that produces the pathological condition. With such precise and exacting conditions can you not accept the result of the labors in proof of the germ theory. Dr. Miller has done all this in his studies on decay, and we have the pleasure of presenting to you ocular demonstration of his researches in the photogravure plate to be found in this number.

OBITUARY.

In our last issue we called attention to the serious illness of Dr. Flavius Searle, of Springfield, Mass., which resulted fatally on February 10, 1889. Dr. Searle was born in Southampton, where he received his early education. He was the oldest dentist in Springfield. He learned dentistry as a trade, but lived long enough to see it exalted to a profession, and had the satisfaction of knowing that he had contributed not a little to that end.

Dr. Searle was recognized as one of the leading men in his profession. He was a charter member of the Connecticut Valley Dental Association, of which he was the first president, and a member of many other organizations of the kind. He belonged to the wide-awake school of progressive dentistry, and always welcomed and practiced any modern and useful advance in the science. He was a close student, spending his spare moments in study and research, and he never tired of doing what he could toward advancing the professiion he loved so well. In 1887 the Connecticut Valley Dental Association tendered Dr. Searle a banquet in honor of his rounding out of 50 years of life as a dentist. The entertainment was an elaborate one, and brought letters and other evidences of good-will from prominent dentists all over the country. A record of the proceedings was published in the form of a memorial volume, elegantly bound, and presented to Dr. Searle as a memento of the occasion, a description of which was published in this journal last year.

Dr. Searle married Miss Abigail Brown, of Brimfield, and had three children, all daughters. His wife died about six years ago. Two years later his eldest daughter passed away, while a second daughter died in childhood. His only living daughter now resides in Boston.

Dr. Searle will long be remembered as the friend of the young practitioner, an earnest seeker after truth, and a man who had the courage of his own convictions, and who was not afraid to speak them when occasion required.

In the death of Dr. Brasseur, dentistry loses one of its leading members, the *International Dental Congress* one its most active promulgators and our Journal a valued correspondent. We had not the pleasure of an acquaintance other than by correspondence, but our intercourse with him had been of the pleasantest character and bade fair to become profitable. We have asked Dr. Bogue, who was intimately acquainted with Dr. Brasseur, to send us some

points relating to his life and demise, and which we have incorporated into this notice.

"Our profession has lost in France a most valuable member by death, Dr. Emile J. N. Brasseur. He was to have dined with a number of professional brethren on the 22d of January. He sent word at seven o'clock not to wait for him, as he was ill. He died about the time the meeting broke up.

Dr. Brasseur was a graduate of the Medical College of France, and he was at the time of his death the President of the Odontological Society of France, the Director of the Dental School of the Rue de l'Abbaye, the Editor of the Revue Odontologique, and he had just accepted the post of correspondent of the "International."

He sent the best illustrated article that came to the dental section of the International Medical Congress on the "Therapeutic Use of Hot Air."

A hot air injector was one of his inventions; so also was an electric examination light combined with an exploring point; an instrument for compressing six or eight amalgam blocks at once was his last invention. It was he who wrote the article on "Dental Surgery" in the new French Encyclopædia.

Wherever work was to be done for the advancement and upbuilding of the dental profession, Dr. Brasseur was to be found doing his share.

He recognized no nationality in science.

He was a friend of Telschow, the German dental inventor. Rosenthal, the Belgian, exhibited his injector at Dr. Brasseur's office.

My first meeting with him was through Sir John Tomes, and for us Americans he has shown the warmest friendship at all times.

His death leaves a void almost impossible to fill, and those of us who knew him must deeply mourn his loss."

DENTAL PROTECTIVE ASSOCIATION.

We call attention to the new circular of the Dental Protective Association on pages 46–47, in our advertising columns, and advise every reader of this issue to send for Constitution and By-Laws, or what is better, send Dr. J. N. Crouse a check for \$10 at once, and thus protect yourselves against suit or injunction for using crowns or bridges. The association agrees to defend each and every individual member of the profession, out of the general fund which we are happy to say is rapidly increasing. Let the profession organize and protect itself.

AN INTERESTING CASE.

A correspondent cites an unusual case of non-eruption of permanent teeth. The subject—a young lady of nineteen—has never erupted either of the four second bicuspids, the left superior lateral, nor the left superior cuspid. The deciduous teeth were models in form, position, and texture, and were shed at the usual time, with normal absorption of roots, with the exception of the left superior cuspid, which was removed with forceps on the first symptom of loosening, the right cuspid being already fully erupted and the left apparently ready to make its appearance.

There is no space for the bicuspids. A plate has been worn for some years, both to fill the unsightly gap, and with the hope that the irritation produced by the pressure of the artificial teeth might hasten the growth of the latent germs of the lateral and cuspid. A tooth is now erupting posterior to the right inferior second molar. Whether it will prove to be a missing second bicuspid, or a third molar, remains to be seen, only one cusp being as yet partially visible which has retreated several times beneath the overhanging swollen gum.

JOURNALISTIC ENTERPRISE.

The February and March numbers of the Review appear as one issue, and contains the full report of the anniversary meeting of the Chicago Dental Society. The volume contains 144 pages of reading matter, which was gotten out in the incredibly short space of two weeks' time, including, also, cuts illustrating the articles read. The work has been well, although hurriedly, done, and shows an amount of enterprise and push on the part of our western cotemporary that might well be emulated by some of our eastern journals. The present seems to be marking an era of advance in dental journalism that we herald as a harbinger of better things in the future. Some other of our cotemporaries have gotten a pointer or two the past year, and have made an effort to be more than recorders of society proceedings.

SPECIAL OFFER.

As the present issue of the journal will reach a large number of new readers whom we desire to make constant readers, we will send the journal to such, for the remainder of the year, from March on, including the December number, for two dollars. Send in your check or P. O. order at once, as this offer only holds good until our next issue, April 15th.

Domestic Correspondence.

To the Editor:

Recent events in the First District Society of New York point unmistakably to the need that exists for a revision of the present meagre rules of professional conduct, called the Code of Ethics. There are many recent evidences that as a class we have been awaking to a realization of our deficiencies in our practical relation, while claiming to be professional men.

The influence and power which trade has been gradually acquiring is now apparent to many who for long have been either blind or indifferent. The hindrances so long unnoticed are beginning to be felt, and "ethics in materials and methods" are beginning to be appreciated. In a more formal way the ethics of fraternal relations has been a subject for serious discussion in the above society. Charges were preferred by one member against another for violation of the "Code of Ethics" and unprofessional conduct, in a case in which a patient of the former was referred to the latter for special treatment of a "sore mouth." The offense consisted in the latter dentist going further than was intended or desired by the former, in making for the patient an artificial denture, after treating the mouth, without consulting with, or informing the dentist who had sent the patient to him. It was understood to have been shown before the committee of investigation, that the patient desired the dentist who treated the mouth to make the denture, and that she declared she would not in any case return to him who had referred her for treatment, and that this declaration, with the repeatedly expressed wish, seemed to be the inducement that led to the action complained of. It was also understood that the committee were prepared to report to the society in favor of the defendant, not proven, on the ground that . the "Code of Ethics" had nothing in it bearing on this case or any similar one, which on reference proves to be true.

The defendant, however, through conviction of error, or unwillingness to trust the temper of the society, formally apologized to his accuser immediately before the meeting which was to have received and acted on the committee's report. So that when the meeting was convened, the announcement was made that such apology had been tendered and received, and the charges withdrawn. Clearer views of fraternal privileges and duties will undoubtedly be formed as a result of the incident, and in this way good has been accomplished; but the inadequate provisions of the

"Code," "adopted from the Code of the American Dental Association," is made so apparent that it may well be hoped that it will lead to a general revision of the code of dental societies, or else to their entire obliteration; so that the accepted rules of professional conduct may be commensurate to ordinary requirements, or that the general moral sense may be left to judges of ethical standards, without being hampered by formal standards of law, which are so insufficient.

To the EDITOR:

When Dr. C. E. Francis introduced "Incidents of Office Practice" as a heading in a society's order of business, he did a good thing for us all. May I not give you an incident? A skillful plate workman last summer asked me why I made my clasps for partial plates so narrow, and why I attached them to the plate by a narrow standard.

He said that a narrow clasp would inevitably wear the tooth to which it was attached, and that I would soon find a groove under the clasp just the size of the clasp.

I replied that the groove was generally found whatever the width of the clasp, but that it was never the result of wear, inasmuch as it would be found under a soft rubber clasp quite as surely as under a gold one.

"Yes," he said, "that's so; but what makes the groove?"

I replied, "the chemical action of fermenting food lodged between the clasp and the tooth, and the bigger the clasp and the broader its attachment to the plate, the larger the amount of food that continuously lodges there."

A patient, yesterday, returned to me after many years of absence. She had a plate in her mouth that I made sixteen and one-half years ago, clasping the bicuspid teeth.

One of those teeth I extracted, as it was too loose to remain longer; the clasp was still around it after all those years.

I send you clasp and tooth that you may see their conditions.

My own description of the case would be, that being so nearly self-cleansing, the clasp had done practically no harm to the tooth; for while a little wear is visible on one side, I think that damage has been counter-balanced by the rubbing which has tended to free the tooth from foreign deposits.

If clasps are put just above the tuberosity of the tooth where the enamel is thick (not up by the neck where it is thin), and are soldered by a narrow standard, leaving as much elasticity as possible, there is very little evil effect from a narrow clasp in a moderately cleanly mouth.

New York City.

E. A. BOGUE.

[Tooth and clasp were duly received and showed, as described, only very slight abrasion; so little, in fact, as to be quite remarkable after so long wear.—Ep.]

To the Editor:

Rubber dam clamps are among the most valuable instruments that a dentist uses; at the same time they are among them most dangerous. Any one who has used them for a long series of years has had cases where decay came as the result of the injury inflicted on the enamel by the hard and sharp edges of the steel jaws of the clamp. I have seen many such results in delicate teeth, and have sought for some means to overcome this. In my own practice I employ clamps with adjustable jaws of soft metal or other substances like hard rubber and celluloid. These jaws are easily replaced if injured, and enamel would require to be very soft, indeed, to receive injury from such clamps. I have never seen a case that showed subsequent decay from the use of my clamps. I describe them here in order to prevent, if possible, some unscrupulous person from patenting the invention, which consists briefly in making clamps with removable and adjustable jaws; said jaws, instead of being made as at present of hard steel, are constructed of soft metals like tin or rubber or celluloid, or other suitable material; the object being to provide jaws too soft to injure the enamel of the tooth. These little removable jaws can be molded in quantity, and are therefore cheap, and at the same time they are readily bent to fit any special form of the tooth to which they are to be applied; this is a strong point in their favor. Besides this advantage they require but a few clamps to fit a whole set of teeth, for the jaws being removable suitable ones can be selected from a great number and simply placed in the clamps for use.

Boston, Jan. 18, 1889. WILLIAM HERBERT ROLLINS.

A correspondent of the New York World (Nov. 4th) advocates the organization of a S. P. A. T.*

Judging from some signatures recently noted, we suggest that he endeavor to recruit his ranks from among the members of the dental profession, to the manifest advantage of the latter. A. B————e, A.M., M.D., D.D.S., F.R.S., M.S.P.A.T., for instance!

^{*} Society for the Prevention of the Accumulation of Titles.

Foreign Correspondence.

To the EDITOR:

I had the honor to announce to the Dental Section of the International Medical Congress, at Washington, that the dentists of France deem the time of the holding of the "Exposition Universelle" a suitable occasion for the reunion of the dentists of all nations for the consideration of scientific and practical questions of interest to the profession.

In assembling this congress the French dentists do not wish to interfere in any way with the Dental Section of the International Medical Congress to be held in Berlin. In the domain of scientific and professional knowledge, emulation and progress are achieved by union and concourse of all. It seems to us, however, that there is a scientific and practical advantage to dentists in having a congress of their own. Our art is far reaching enough and of sufficient special importance for dentists to hold assemblies by and for themselves. We do not lose sight of the points that are of common interest to the general practitioner and the dentist, but in our eyes they are not sufficiently numerous to necessitate the union of the two in one general congress,

These reasons seem sufficient to justify the calling of the First International Dental Congress.

In order to facilitate the division of the work, and for the proper examination of the various communications, the committee of organization considers it best to divide the congress into sections. It has also been considered advantageous to concentrate the attention of the members of the congress upon questions determined upon in advance—leaving it to the congress to introduce others if thought best.

The following sections and questions have been arranged: Section First:—Anatomy, Physiology, and Pathology.

- 1. The teeth of different races.
- 2. The "röle" of micro-organisms in dental and oral pathology.
- 3. The influence of nutrition in producing and resisting dental caries.
 - 4. Dental and oral classification and terminology.

SECOND SECTION: - Operative and Therapeutic Dentistry.

- 1. Treatment of teeth with diseased and dead pulps.
- 2. Comparative value of gold and plastic materials for filling teeth, with observations on recent progress in this direction.
 - 3. Local anæsthesia.

THIRD SECTION: - Prosthetic Dentistry and Oral Deformities.

- 1. Artificial crowns, bridge work, when indicated, and manner of construction.
- 2. Irregularities of the teeth and alveolar arches, with new methods of treatment.
 - 3. Choice of material for artificial dentures.
 - 4. Restoration of the face and jaws.

FOURTH SECTION: - Dental Education and Hygiene.

- 1. Instructions in dental art, methods, length of studies.
- 2d. Dental and oral hygiene during the process of dentition.

In order that the discussion may take the widest range and that the majority of the congress may be acquainted with the principal ideas of the communications to come before the congress, it has been decided to translate into French all papers and put them in print, provided they are received before July 1st, and do not exceed six printed pages in length. By so doing, all can come to the meetings having the text for the discussions.

It will be seen that the organizers of the International Dental Congress of 1889 have labored to the best of their ability to make this grand reunion profitable, not only to themselves, but to the great number of visiting dentists who will comprise no small part of the congress.

It was at first proposed to convene the congress on August 15th; but on learning that the meeting of the American Dental Association takes place at about that time and would prevent, most likely, many from attending, it has been decided to change the time to September 1st, in order to give our American confreres an opportunity to be present and co-operate with us.

It will be an excellent time to see Paris during the exposition. Living in France is cheap. The committee propose to furnish visiting dentists with a list of hotels agreeing to accommodate them at a price fixed in advance. It is thought houses can be found that will furnish excellent accommodations for three or four dollars a day.

The officers of the commission of organization are:

Dr. David, President.

Dr. Brasseur, Vice-President (deceased).

DR. SAUSSINE, Vice-President.

Dr. Pourchet, General Secretary.

DR. KUHN, Treasurer.

Dr. Blockman, Secretary.

Dr. Damain, Secretary.

Dr. Godon, Secretary.

All communications should be addressed to the General Secretary, M. Pourchet, 24 Rue de la Chauseé d'Antin. I shall also be happy to give your readers any information in my power. Address, Bureau de l'Odontologie, 2 Rue d'Amsterdam.

It is with great regret that I have to announce the sudden death of our most worthy associate, M. Brasseur, whom you had the good fortune to secure as correspondent for the International Dental Journal. He was greatly esteemed by the French dentists. He was much interested in the use of hot air in therapeutic dentistry, and he had but recently devised a perfect electric injector.

In my next letter I shall speak more particularly of professional affairs in France.

(Signed) P. Dubois,

Feb. 4, 1889.

President of the Odontological Soctety of Paris.

Translated by DWIGHT M. CLAPP.

To the EDITOR:

I want to use some very grateful expression as my heading, but fail to find one which will convey the gratitude your friends over here feel for the splendid New Year's present you gave us in the Topical Index for the 1888 volume. As there seems to be a feeling that your journal, coming out fifteen days after the Dental Cosmos did with its monthly topical index, had perhaps taken the cue from that Journal, I may remind you that you wrote me on December 18th, 1888, that you had a complete topical cross index prepared for Volume IX (such as I had insisted upon the necessity of early in your administration), and that it would be added to the January No. You will, no doubt, receive the blessings of multitudes of new subscribers who have spent hours in fruitless search for some little thing which would be worth the price of the volume to them, if they could only find it.

What will your next surprise be?

I am glad to hear you intend to illustrate freely all articles which require it.

L. C. BRYAN.

Basel, February 4, 1889.

Current News.

The Dental Protective Association is all the rage.

Don't forget to read their circular and send in your membership fee at once.

The International Tooth Crown Company has added new patents covering the principle involved by removable bridge work and other appliances in use by the profession.

"When a dental journal must remind its readers that 'it still leads,' is it not time to begin to see if some other journal is not doing something in the same line."—Dental Review.

Those are our sentiments, too .- ED.]

Dr. W. N. Morrison states that deposits may be removed from very loose teeth by using a very delicate long-bladed spicula forceps, one hand resting on the incising edge of the tool to steady it.

The dental student has only time for that which is essential to dental practice. He needs dental therapeutics, dental pathology, and dental anatomy. He has no need for the anatomy of the foot. for he always stands at the head.

Hygiene, says Dr. George J. Friedrich, begins where two wandering molecules meet, and begin what you and I are to be, and last till these elements are restored to dust. We are created but little lower than the angels, but neglect of this beautiful casket is the most frequent source of sorrow and suffering.

Regarding the toxological effects of cocaine, Dr. Story relates the following: "In using cocaine for spraying the throat some was spilled on the floor, and the next morning three dead rats were found on the spot. To test the matter, some four per cent. solution was purposely spilled, and the next morning four more dead rats were found." He thinks this should make us more cautious in its use.

In his paper on "Dental Literature," read at the Louisville meeting, Dr. B. Holly Smith says the degree of D. D. S. can no longer be the badge of partial culture, but must represent the accomplishment of certain definite, specified work, requiring abundant ability, patient study and constant application; and that all recent writers, while sadly at variance with regard to the methods by which it is to be obtained, are in perfect harmony as to the advisability of it, and the belief in its ultimate adoption; all admitting, however, the necessity for a thorough preparatory education.

With regard to dental college education, Dr. Ingersoll, in his paper on the subject, says: "While lectures are an economy of time and labor to the teacher, the student must have a disciplined mind to reap the full benefit of this system." As a rule, the lecturer has a too rapid flow of ideas for the average pupil to catch, and not the full import of his remarks. The knowledge gained, as a rule, from lectures is extremely small, unless the pupil has read up reference books, in which, however, he will recognize only here and there a thought of the lecturer. Our text-books are abundant and valuable, but no time is allotted for their study, and it must be taken from sleep."

At the Louisville meeting, last September, Dr. Sudduth said he considered the prospects of success much more favorable in implantation than in transplantation. In the first place a healthy tooth is placed in a clean socket in healthy tissues. In the latter case a tooth so badly diseased that it is condemned is replaced in necrosed and abscessed territory, where everything is against it. In implantation there is no retrograde tendency to overcome. The only difficulty in the case of an implanted tooth is its fixed, immovable position without the interposed elastic cushion of pericementum, which enables the normal tooth to resist the shock of mastication.

Dr. Catching states that union by ankylosis was proven in the case of a tooth implanted by Dr. E. S. Chisholm. On its removal it was found necessary to nip off the adhering alveolar process, so firm was the union.

Dr. Ingersoll claims that dentistry, in the common acceptation of the term, is not a specialty of medicine. Professors in medical science cannot give instruction in practical dentistry. Dentistry is not a specialty of medicine either in its literature, in its colleges, or in its teachers. It is an independent science. The student of dental anatomy does not study medicine any more than the schoolgirl who studies a school text-book on anatomy and physiology. She also studies chemistry; but it is as a natural science, not as medicine. The clinical rooms of a dental college should not be called an infirmary. Patients do not come there because of their infirmities.

Dr. Taft considers that all the discussion of the relations of dentistry and medicine are most unprofitable. The two are so interblended and interwoven that it is utterly impossible to separate them. Dentistry is a most important branch of the healing and restorative art.

Regarding the manner of instruction in our colleges, he thinks it would be profitable to have a normal class of teachers, who could spend a week or so in discussing methods. As each finds a better method, let him give it to others. Interchange of visits would also be beneficial. A valuable feature is a syllabus of each lecture, with reference to pages of books of reference that deal tersely with certain points, and which the student is required to study up. Requiring him to write out his own views after posting himself will make the student studious and careful.

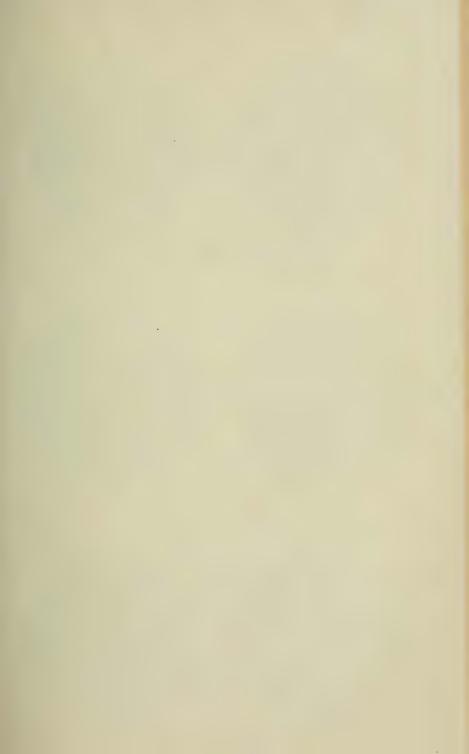
College instruction, Dr. Morgan says, should be imparted more by recitations and demonstrations than it is. Forty descriptions of a thing are not equal to one sight of it.

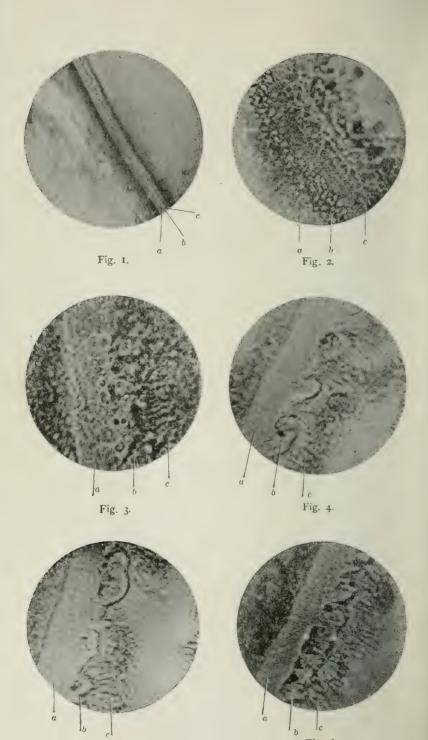
DR. CARL SEILER'S ANTISEPTIC SPRAY FOR REDUCING ACUTE AND SUBACUTE INFLAMMATION OF NASAL MUCOUS MEMBRANE.

Sodii bicarb	3 viij.
Sodii bibor	3 viij.
Sodii benzoate,	
Sodii salicylate	gr. xx.
Eucalyptol,	
Thymolãā	gr. x.
Menthol	gr. v.
Ol. gaultheria	gtt. vj.
Glycerine	
Alcoholis	3 ij.
Aquæq. s.	16 pints.

This formula gives a solution which is sufficiently alkaline to dissolve the thickened secretion adhering to the nasal mucous membrane, and as it is of the proper density, it is bland and unirritating, leaving a pleasant feeling in the nose. At the same time it is antiseptic and acts as a deodorizer, being in this respect far superior to Dobell's solution or any other non-irritating deodorizer and antiseptic. As it is, however, inconvenient for many patients to have so large a quantity of solution on hand, one of our Philadelphia druggists made the solid ingredients into a compressed tablet, so that one, when dissolved in two ounces of water, will make a solution identical in its effects with the solution made after the above formula, and my patients prefer the tablets to the solution.—From a Reprint.

[This solution forms a most excellent mouth wash in stomatitis and ulitis from any cause.—Ed.]





DESCRIPTION OF PLATE

FOR

DR. ANDREW'S ARTICLE

ON THE

BORDER LAND OF CALCIFICATION.

- Fig. 1. Layer of formed dentine, A. Calco-globulin, B. Odon-toblastic layer and pulp tissue, C. Cross section calf tooth at birth, magnified 200 diameters.
- Fig. 2. Outer edge of formed dentine, A. Small globular masses, calco-spherites, B. Pulp tissue, C. Tooth of human feetus, 6th month, vertical section, magnified 1200 diameters.
- Fig. 3. Forming band of dentine, A. The layer is seen to be made by the coalescence of the globular masses, B. Odontoblastic layer and pulp tissue, C. Cross section calf tooth at birth, magnified 1200 diameters.
- Fig. 4. Band of formed dentine, A; with buds of calco globulin forming new layer, B. Odontoblastic layer and pulp tissue, C. cross section calf tooth at birth, magnified 1200 diameters.
- Fig. 5. Band of formed dentine, A, with large masses of calco-globulin forming new layer, B. Odontoblastic layer and pulp tissue, C. Cross section calf tooth at birth, magnified 1200 diameters.
- Fig. 6. Band of formed dentine, A; with buds of calco-globulin forming new layer, B. Odontoblastic layer and pulp tissue, C. Cross section calf tooth at birth, magnified 1200 diameters.

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THE BORDER-LAND OF CALCIFICATION.2

BY R. R. ANDREWS, CAMBRIDGE, MASS.

In studying the formation of dentine with the higher powers of the microscope, in tissues which have been decalcified by the action of weak acids, there is found between what was the fully calcified tissue and the adjacent organic tissue from which it is formed, a peculiar layer, hyaline in its appearance, and which has been named calcoglobulin. In an investigation extending over several months, I have been much interested in studying its formation. The sections which I have prepared, that show this layer best, are cross sections of forming teeth, at a period when calcification is commencing, or perhaps better, on the edge of a calcifying dentinegerm at any stage before the tooth is wholly formed. The peculiar globular formations, next the formed layer of dentine, show best in tissue that has been in the decalcifying acid for two or three days only.

A brief description of the experiments of Prof. Harting and Mr. Rainie, showing the peculiar action of some of the salts of lime in albumen, may be of interest to us at this point; for they claim by these experiments to have found the explanation of the method of development of teeth, bone and shells. Mr. Rainie found that if carbonate of lime be slowly added to a thick solution of albumen, the resultant salt is in the form of globules laminated in structure like tiny

² Read at the Tenth Anniversary Meeting of the Odontological Society o Pennsylvania, Dec. 12th, 1888.

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

onions; the globules in contact become agglomerated into a single laminated mass, appearing as if the lamina in immediate apposition were blended with one another. The globular masses, at one time of mulberry-like form, lose the individuality of their constituent smaller globules, and become smoothed down into a single mass. Mr. Rainie suggests, as an explanation of the laminated structure, that the smaller masses have accumulated into concentric layers which have subsequently coalesced, and in the substitution of the globular for the crystalline form in the salt of lime when in contact with albumen, he claims to find a satisfactory explanation of the development of bone, teeth and shells. What he found was really the first stage in the process of the calcification of a tissue.

Prof. Harting has shown that the albumen left behind, after treatment of these globules with acid, is no longer ordinary albumen. It is profoundly modified, and has become exceedingly resistant to the action of acids, resembling chitine, the substance of which the hard skin of insects consists, rather than any other body. The small onion-shaped globular bodies, he has named calco-spherites, and the layer caused by the coalescing of these, calco-globulin, as it appears that the lime is held in some sort of chemical combination; for the last traces of lime are retained very obstinately when calcoglobulin is submitted to the action of acids, in the same manner as does that layer which is found everywhere on the border-land of calcification between the fully calcified and the formative tissue. In the course of my investigation I have found many sections showing the formation of these peculiar globular masses on the edge of forming dentine (see Plate, Figs. 3, 4, 5, and 6). One of my specimens shows the edge of dentine, which is to be covered by enamel, overlaid with small globules. (See Plate, Fig. 2.) These are calco-spherites. Those nearest the dentine have become a part of the matrix showing only a portion of their contour; others near them are spherical, of various sizes, and have a glistening appearance; some are made up apparently of a number of smaller ones. At a point a little above, in the same specimen, this time on the edge of the forming enamel, are seen elongated masses of this substance, made up of many small globules, or calcospherites, which are losing their identity. This section is from a human feetus in the sixth month. Among many cross sections that I have prepared from the tooth of a calf, at birth, there are some which show these globular formations very beautifully. If we examine another, using a low power, 1 inch, we shall see the band of forming dentine to be about as wide as the layer of odontoblasts just within. The section has been stained with alum carmine, but has taken the stain faintly. Next the dentine, towards the pulp, and apparently among the odontoblasts, are seen, even with this low power, irregular glistening globular masses. At a point just below where these are seen, the pulp tissue and the odontoblasts have been pulled away from the layer of dentine, with no appearance of globular masses elinging to it. The edge has a glistening appearance, something like the globules mentioned above; under a high power, 1-12. Im. obj., this glistening edge shows rounded contours, as if there had been globules which had become part of the already formed band of dentine. In the substance of some of the odontoblasts, and even in the tissue of the pulp near them, are seem small glistening globules, calcospherites.

In another section the narrow forming band of dentine is seen to be made up mostly of globular masses. See Plate, Fig. 3. are especially bright toward and among the odontoblasts. Nearest the pulp they have the glistening appearance which is seen in fat cells. In still another section these globules are in line and have nearly formed what is to be a new layer of the dentine matrix. They have taken the stain nearly, if not quite as well, as the dentine already formed, and commence to look very much like it. In places against the formed dentine some of them have, where they were against it, become a part of it, merging into it. without any line of separation whatever. (See Plate, Figs. 4 and 6.) Smaller globules appear to be imprisoned between them, nearest the dentine, and these have a marked granular appearance. The forming layer is, at this very early stage of the formation of the dentine, about as wide as the layer of dentine formed, and is also about as wide as the layer of formative cells—the odontoblasts—sometimes, though wrongly, called the membrana eboris. At a later stage, when the calcified layer of dentine is thicker, the layer of calco-globulin is much narrower; and while I have never been fortunate enough to observe it forming in this manner, yet indications of globules and globular masses are never difficult to find within the layer of calco-globulin.

I have been somewhat interested in this connection by a paper read by F. J. Bennett before the Odontological Society of Great Britain, "On Certain Points Connected with the Structure of Dentine." Having become interested in some of the experiments of Dr. Miller, Ord., in which it was stated that pieces of ivory became eroded if immersed in a solution of subcarbonate of potash in

glycerine, Mr. Bennett experimented with tooth structures under similar conditions. First, freshly extracted teeth were ground sufficiently thin to allow microscopic examination, and were then immersed in glycerine, or one of the carbonate or subcarbonate solutions (as above), and after various periods—one to six months examined in glycerine. The dentine was found to have become transparent at the margin of the pulp chamber of longitudinal sections; the adjacent dentine was seen, under a low power, to be fringed and laminated. Under \(\frac{1}{6} \) inch obj. this appearance was seen to be due to the dentinal tubes having lost their intertubular tissue. The course of the tubes appeared further to be interrupted at regular intervals by layers of what Mr. Bennett calls membranes having a direction parallel to the surface. These layers resemble the appearances seen in interglobular dentine; but circular apertures replaced solid globules, and oval spaces existed between the layers. Through these circular apertures dentinal tubes could be seen crossing from one layer to another, and completely freed of intertubular tissue. The tubes seemed to be measured off regularly into short lengths by the crossing of the layer

Later on he says, "Glycerine had clearly acted, but not destructively, since changes were brought about by it resembling normal developmental structures, it had acted selectively. Various explanations of the changes described were offered; among others, this: That the layers merely represented a part of the matrix itself, which resisted the action of the glycerine. The surface of the layers might present different stages of calcification, and thus offer a variable power of resisting the glycerine, the circular spaces representing portions which had been removed. This view, if correct, would accord with the theory of globular calcification in dentine. Interglobular dentine, if submitted to glycerine action, shows appearance of a membrane around the globules, and this fact supports the above given theory."

So much for Mr. Bennett's paper. It is somewhat difficult to arrive at exact conclusions in regard to this globular formation of the dentine. My investigation leads me to believe it is the first form that exists, previous to a calcified layer; that is, that small globules coalescing, form large ones, and these again coalescing, form the layer of calco-globulin which, by complete calcification, forms the dentine matrix or basis substance. While there are seen small glistening bodies, calco-spherites, in the pulp tissue near the odontoblasts, it is probable that the ones which form the larger globular masses have, for their source, the odontoblasts. In many

places there is an appearance as though the odontoblasts were being enveloped in the larger globular masses that are forming the layer of calco-globulin, and which become, by calcification, the basis substance of the dentine. I am not, as yet, certain of this, however.

REMOVABLE BRIDGEWORK1.

BY. T. S. WATERS, D.D.S., BALTIMORE.

In addressing you on this occasion I feel that I am speaking on a subject that while really old, is yet comparatively new.

Bridgework was made many years ago, but it was not then known by that name. Our professional predecessors made bridgework decades ago by inserting gold plates with teeth on them and retaining them in the mouth by two or more gold pins soldered to the plate and extending into the roots left in the mouth. This was primitive bridgework, but nevertheless it was bridgework. Therefore the subject is an old one.

But improvements have been made in the methods of applying bridgework, which have changed its character and features,—without changing its basal principle,—and to that exent it is new.

The bridgework of the present day may be divided into two classes: the rigid or permanent, which cannot be removed without a special operation by the dentist; and the removable, which can be removed and replaced at the pleasure of the wearer.

The ancient bridgework before spoken of, belongs to the former class, but of late years bands, ferrules or caps enclosing the roots at the neck, or the remaining natural crowns have been substituted for the pins extending into the roots and this constitutes one of the new features of bridgework. Another new feature of bridgework, when rigid or permanent, is the dispensing with the plate formerly used. This was considered necessary from a cleanly and therefore hygienic point of view, because a plate covering a considerable portion of mucous membrane and not removable, would, of course, allow the collection and retention of food in a semi-fluid state between the two surfaces, which would not only be uncleanly, but would by its constant presence affect injuriously the sanitary condition of the mucous membrane with which it is in contact. To further avoid the bad results of having any portion of the mucous membrane covered permanently with a plate, the device was adopted of cutting away the lingual or palatine portion of the artificial teeth next the gum, so that only the base of the

¹ Read at the tenth aniversary meeting of the Odontological Society of Pennsylvania, Dec. 13, 1888.

labial or buccal sides should come in contact with the gum. This, it was thought, would not only secure the healthy condition of the mucous membrane, but would also make the piece self-cleansing; but it is doubtful if that object is accomplished, since the surfaces which are inaccessible to the mechanical action of the food in mastication or of the tooth brush in cleaning, will in many mouths, be found always covered with a deposit, nor can the requirement of thorough cleanliness be fully met in any case in which the piece cannot be removed and properly cleaned. I beg to be understood here as referring to bridgework only, and not to single crown cases, because in the latter every part is accessible to the mechanical action of the food and the brush, as are the natural teeth.

As we have said that in permanent bridgework the plate is dispensed with for purposes of cleanliness and hygiene, it is proper here to discuss, to some extent, the functions that a plate performs as a bearer of artificial teeth.

It is sufficient for present purposes to speak of only one of these functions. It is the experience of all dentists that when a plate is used with a small surface, the pressure that is brought to bear upon it in the process of mastication, causes a rapid absorption of the subjacent tissues both soft and hard and it has been found necessary in the insertion of a small number of teeth, in order to avoid as far as possible this bad result, to make the plate as broad as the case will admit, thus distributing, what may in such cases be called a fixed amount of pressure for each case, over a broader mucous surface lessening the evil from absorption; and I would suggest that in all cases where plates are used this pressure should, for obvious reasons, be so distributed as to bring as great a proportion of it over the hard or true bone, and as small a proportion over the softer alveolar structure as the case will admit.

The necessity of guarding this point will be better appreciated if we give due consideration to the very great force exerted by the masseter muscles in mastication.

One of the offices, then, and a very important one, of a plate bearing artificial teeth is to so apply, divide and distribute the pressure on the mucous surface as to produce the least possible injury to the subjacent tissues, and I consider this point of so great importance that I hold that it is wrong to dispense with the plate (as is done in permanent bridgework) for the reason that the use of a plate in bridgework relieves the teeth and roots to which the denture is attached of much of the strain that is brought to bear in mastication, and transfers and distributes it over the mucous surface.

Dr. E. C. Kirk, in his paper on the "Hygienic relations of artificial dentures," page 1022, vol. 2, of American System of Dentistry, sets forth plainly and, in my opinion, correctly the objections to a certain class of bridgework, which can only be said of that which is permanent and without plates. But the bad results spoken of in these objection are, as I believe, fully met and avoided in the system that I have the honor and pleasure now to present to you, viz.: that of removable bridgework, because in it the denture is retained securely and steadily in the mouth yet is readily removed and replaced at pleasure by the wearer,—the pressure and strain are distributed properly over all structures and tissues available for that purpose, and the roots and crowns to which the denture is attached are so prepared that there is no place for the lodgement and retention of food, and when the denture is removed, both it and the mouth can be thoroughly cleansed.

It is also so evident as not to require explanation that should the roots or other tissues be attacked by disease, thus requiring treatment, or should repairs to the mechanism become necessary, the removable bridgework offers facilities for those purposes not to be found in that which belongs to the permanent class.

I do not claim, that the idea of removable bridgework is original with me, but I do assert and claim that I constructed the first really practical piece of bridgework of which the wearer had perfect control as to removal and replacement, and in which, by the means adopted, the best possible hygienic condition is attained.

Having accomplished this much I was led to devote my studies and energies to the combination and application of such devices as would best effect these desirable results. Most of these devices were known to the profession, but their combination and application as now presented to you, I believe to be new in bridgework, and to these devices and to dentures illustrating their character and application, I call your attention.

These devices are three in number, each one of which may be used alone or two or all three may be combined in the same case, and applied as the position, character and relation of the teeth and roots remaining in the mouth may seem to indicate.

The first one that I bring to your notice is a gold crown fitted to and sliding on a cap attached permanently to the root or natural crown. This cap is made high and has on one side a longitudinal groove. See Fig. 1. The gold crown has soldered on the inside a spring catch, which works in the groove on the cap and holds the crown firmly in its place. See Fig. 2.



Fig. 1.

Cast of practical case showing bicuspid and molar, capped ready for the application of bridge. The longitudinal slot or groove is seen on the mesial face of the bicuspid.

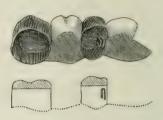


Fig. 2.

Bridge-piece ready to apply. The outlined figure represents the capped teeth shown in cut No. 1.

This device may be used (though I do not recommend it) in simple crown cases, and allows the removal of the crown at pleasure for the purpose of cleaning. It will be readily seen that, under proper circumstances, two or more roots or teeth, may be fitted with this device, the gold crowns being soldered to and made a part of the denture, making the whole a piece of bridgework capable of being removed, cleaned and replaced at the pleasure of the wearer. the spring catch regulates the firmness of retention. See Fig. 3.



Fig. 3.

The above piece of bridge-work applied.

This is my own invention, and I obtained letters patent for it in order that I might secure it and donate it to the profession, which I have done.



Fig. 4.

Cast of case showing six anterior teeth prepared for the application of the split-post attachment.

The next device is the box cap and split post, the box cap being fitted permanently to the root and the split post being soldered to the plate bearing the teeth. The box cap is the usual cap with a box or tube soldered to it and extending into the root, the cap end of the tube being open. The split post is so secured to the denture

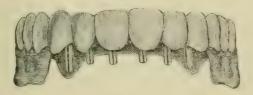


Fig. 5.

Piece of bridge-work with split pins ready for application.

as to slide snugly into this tube, the firmness of retention being regulated by pressing the split slightly open when necessary. This device like the first may, under proper circumstances, be used altogether in any one case as shown in Figs. in which case the whole denture is supported by box caps and split posts adjusted to the roots of the six anterior teeth.



Fig. 6.

The above piece of work applied.

The third device is that of soldering to the side of the gold crown covering the natural tooth, a split pin or post, which is inserted into the open tube attached to the denture. See molar tooth Fig. 7. This device, like the others, can be used alone in any one case.

This device, like the others, can be used alone in any one case

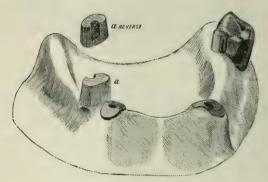
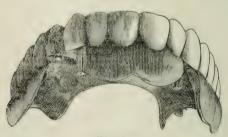


Fig. 7.

Case where both the preceding features are used. In this case, however, the split pin is soldered to the tooth cap.

as illustrated in Dr. George Evan's "Practical Treatise on Artificial Crown and Bridgework," page 184, figures 383, but which is credited to Dr. H. A. Parr.

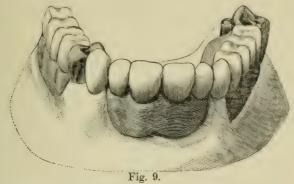
As before remarked these devices may be used singly or in



Fi.g 8.

Piece ready for application.

combination in any one case. In one of the dentures, Fig. 6, submitted to you the box, cap and split post alone are used; in another, Fig. 1., the cap, gold crown and spring catch only are used in another, Fig. 7, the three are applied, in which the entire denture is attached to and retained by two cuspids, a bicuspid and a molar.



Bridge shown in Fig. 8 applied.

In all this, great care must, of course, be taken, in the preparation of the roots and natural crowns to protect them against the action of destructive agents.

With this preparation of the roots and natural teeth with the proper adaptation of these devices, and with the use of as large a surface of plate as the case will admit, your speaker is at a loss to conceive why removable bridge work should not become the work of the future, and he leaves the subject for your consideration with the remark, that the use of removable bridgework, of the character and with the features above presented, will relieve the dental profession from the domination of the International Tooth Crown Co., which it is trying to exercise by virtue of its ownership of the "Lowe Patent."

THE PULP AND TREATMENT OF PULP CANALS.1

BY JAMES TRUMAN, D.D.S.

The pulp of each tooth must be considered, not as a separate entity, but as a part of a living body essential to its life and a factor in its nourishment. While this is understood there seems to be more or less confusion arising from the want of due consideration being given to this fact. Its connections are so intimate with all the various tissues composing the tooth body, that a lesion affecting one may be regarded as having an influence more or less potent on all. The inflammatory results of irritation are divided under a number of distinct heads; yet a description of one will necessarily include them all, for they are intimately involved in one common origin. This inter-dependence one upon the other renders it all

¹ Read at the Tenth Anniversary meeting of the Odontological Society of Pennsylvania, Dec. 13, 1888.

the more necessary to have the subject clearly understood in its elementary and simple relations before proceeding to the consideration of the more complex.

The pathological state of the pulp, beginning with the first degree of irritation in thermal influence, to the closing scene when devitalization has destroyed the function of this original formative tissue, is one of interest to the practitioner and the successful management of which necessarily, marks the progressive stages of the dental profession. The reason for a word now upon it must be found in the fact that for a long period the treatment of the pulp has been relegated to the finished work of the profession, with the natural result, that practices have been developed wholly at variance with accepted views of a quarter of a century ago and not in accord with observed facts of more recent development. The ideas regarding the philosophy of treatment of pathological conditions have undergone a marked change in the past few years; so great, indeed, that no apology need be offered for opening up the subject for further discussion. The day has certainly passed when the creosote and carbolic acid of a bygone time can longer assume to dominate the dental pharmaceutical preparations; or that other remarkable period when empiricism took the place of intelligent reasoning. While it is true that it has passed away with many, it has not with all, and it is still a question whether there is any other branch of our speciality where more confusion abounds in regard to practice than exists here. While anything I may write may not clear up this subject it is to be hoped that there may be some light thrown upon it, and a few of the difficulties that have environed it removed by the discussion that ought to follow a subject of such vital practical importance.

Pulps have been the theme of endless comment, and their preservation and destruction have involved the expenditure of a vast deal of energy in the attempt to affect both in a satisfactory manner. From the time of Spooner, with his introduction of arsenic, to the days when Harris vigorously opposed and then subsequently conceded its value, to the period when it became the universal devitalizer, or to that later time when it was again denounced as unfit to use, and we were called to retain the life of the pulp at all hazards. When capping came in under new and superior modes, than were possible originally, to the period in which we now live, when the profession demands to know the reason for all these changes and asks for some explanation of the great variation in opinion on all topics in connection with the pulp and the treatment of canals-

The confusion of ideas must strike the casual observer as not altogether creditable to a so-called "learned profession." There must be a reason for this contrariety of opinion, based as it doubtless is on observation; yet we are no nearer a consensus of opinion to-day than we were forty years ago, and it is questionable whether we are as near the centre of truth on this subject as Maynard, Townsend. Westcott and others were, when they so beautifully illustrated their skill as manipulators in filling canals. I think the most candid observer must concede, as he reviews the work of that period that the practice of canal treatment, as a whole, is inferior to that time. In examining this subject I have tried to divest myself of the feeling "that the former days were better than these;" but it is impossible to resist the conclusion, that while there has been great advances in other directions, there has been a retrograde in this. Indeed, we are where capping left us in the earlier days of 1850. with this improvement, that we know more of general pathological treatment. I am not, however, to discuss in this paper capping or its failures; but I wish to say this, that in exceptional and selected cases of extra vitality capping may be, and I know is, often a success; but in all cases where the pulp has assumed pathological. conditions the retention of life must be of very rare occurrence if it ever takes place. This, if it be true, narrows the border of life in the pulp to such limits that we are forced to consider other modes and rely on pulp extirpation, until something better is developed out of the present chaos of professional thought worthy of our acceptance. I, therefore, leave the question of preservation entirely in the hands of others and confine myself exclusively to devitalization and the measures required for the subsequent preservation of the tooth for future usefulness.

The well-known modes of pulp destruction are: 1st. Forceful and immediate extirpation. 2d. The destruction by an escharotic, and 3d. By the slow process of death by inflammation. The first two have their advocates, and since the introduction of crowns, the number of operators who prefer driving out the pulp by wood and a sudden blow, forcing the pulp from its connections, are rapidly increasing. This heroic method is seriously advocated as a painless operation. That at times it does not seem to produce much pain must be acknowledged; but I have failed to find any one who could give a reason for this, and in the few cases where I have seen it tried, there was but one where there seemed to be no pain. The character of the tissue thus forced must lead us to look with suspicion on the assertion that no pain is felt. Statistics are

wanting in regard to this, both as to the forceful removal, with or without the injection of a paralyzing agent, and until we have them it may be well to let the matter rest here with the usual conclusion, of all these controverted questions, that much may be said for and against the practice. Death by escharotics has not made much progress since the introduction of arsenic. No agent has been found to take its place, notwithstanding the efforts of the Germans, in their investigations, to substitue iodoform. In the use of arsenic, however, there has been an advance by the application of cocaine and iodoform to inflamed pulps. The former introduced by Dr. Kirk and the latter by myself. As a note of progress I may state that the use of iodoform, in this connection, has received confirmatory assurance of success from so many parts of the world, that the original conclusion arrived at may be regarded as fixed, and that we have at last a mode for the destruction of the pulp without pain, let the conditions be what they may.

Devitalization brings us directly into a maze of pathological difficulties, that it is not remarkable that the most courageous operator stands appalled at the possible consequences. We are met at once with a demand for our highest intelligence, for the greatest patience in treatment, with oftentimes discouraging results that baffle our best efforts for weeks and even months.

The relations of the pulp to the surrounding tissues are well understood, and it would be superfluous in me to enlarge upon them; but for a clear understanding of the argument I must say that the pulp by its prolongations maintains intimate relations with the periphery of the dentine, and by minute anastomoses with every part of this tissue, and, possibly, in some way as yet not clearly made out, with enamel and cementum. Its intimate connection with the pericementum needs only to be stated.

The death of the pulp is produced by, first, irritation. This necessarily follows any exposure. The causes of this incipient irritation are not far to seek. They exist in changes of temperature, of foreign matter collecting in masses—from food and broken down epithelial tissue—of the ever present low forms of life that become pathogenic upon the first favorable opportunity. These, and more, cause the exposed pulp to enter the second stage of inflammation in which the emigration of leucocytes and products of inflammation produce, with the congestion of the vessels, a hyperæmic condition that results in pressure on the sensory nerves, and final strangulation of all the sources of nutrition, and death follows. We now begin to understand how impossible it is that capping can be made

a success except in absolutely normal pulps, and that these latter are exceedingly rare presentations. That it is possible to restore the pulp by starting the nutrient currents into normal activity must be conceded; but that, as before stated, cannot be the general rule, the exceptions being found in cases of extraordinary resisting vital powers.

The destruction of the pulp is progressive as a rule; that is it begins at the surface and may remain for indefinite periods as a superficial inflammation; or, as I choose to call it, superficial chronic pulpitis. Devitalization proceeds slowly until finally the entire pulp is involved in destruction. From my observation I am inclined to think that it is rare to meet with the destructive inflammation in this organ so common in other tissues. Pus is to be found in pulps, and Black describes a condition he terms abscess of the pulp; but it would seem that the pus present must originate solely by emigration and not by the retrograde metamorphoses of the tissue. The death of the pulp from whatever cause, opens up to the operator the whole question of treatment, which I will endeavor to consider. I propose to examine the result from my point of view, following the various modes adopted and the possibilities of a successful termination.

By the forceful method the pulp is severed from its connections by a violent process. It is torn from the prolongations entering the tubuli and equally so from the sources of nutrition at the foramen. The canal is, to a large degree, freed from organic material. Is this true of the tubes? We have no evidence that the removal of the organic portion—the inner tubular tissue—has been disturbed at all. Its sources of nutrition have been cut off, for there are no facts to warrant the opinion that dentine retains its vitality after the pulp has been destroyed. Now it is in just such cases that the advocates of immediate filling hope for the best results, and it is here they should have it if it is ever possible. I am not prepared to deny the conclusions of those who regard immediate filling as the best. They have excellent reasons for its advocacy in this forceful removal. It is true that the organic tissue left in the canaliculi will gradually disintegrate, and slowly carbonize and eventually discolor the tooth; but if the canal be thoroughly filled I fail to understand how subsequent ill results, in other directions, can follow. This presupposes, of course, that antiseptic treatment has followed the removal of the pulp and continued until the canal filling is inserted. The favorable conditions found here do not exist under other modes of extirpation of this

organ and, in the nature of the case, all immediate canal filling after the use of arsenic or death by inflammatory processes, is bad practice. This may seem a dogmatic assertion, and it is a positive statement; but in my judgment it is one easily proven from accepted facts.

Arsenic acts by paralyzing the nervous supply of the pulp, and thus in cutting off the sources of nutrition death follows. Decomposition, while more slowly produced, is sure to result from the application of this agent; besides it is important that immediately upon the removal of the visible pulp there should be applications to limit the action of any remaining arsenic absorbed. The immediate filling of the canal makes this impossible. Carbolic acid acts remarkably after the application of this agent. Clinically it has been noticed that it reduces the hyperæmic condition produced by arsenic, probably, by holding the agent in solution and preventing its further direct action. Time is, therefore, an important matter in the treatment of a canal after devitalization by this agent and immediate filling is inadmissible.

The third condition, that of death by the gradual process following either superficial or acute pulpitis, is one that has in all periods been regarded as the most difficult in the sense that the prognosis was always necessarily unfavorable. It may be well to consider the causes that lead up to this in cases of this kind. From the very beginning of irritation followed by a hyperæmic condition of the vessels of the pulp, there is an accumulation of micro-organic life. These low forms have been known and recognized for many years, indeed as far back as Leuwenheck, who first described bacterial forms; but, as you all know, it has only been of recent years that they have been appreciated in a pathological sense, and this is due to the work of Schreder, Pasteur, Bastian, Lister, Beale, Leber, Rottenstein, Koch, Miller and many others. There can be no inflammation of the pulp, or, for that matter, any inflammation of the mouth, that these forms do not take part as factors in the increase of the destructive effects. They are the invisible irritants both by their immediate presence and by their products.

This brings me to the consideration of the antiseptic treatment of canals. It has been but a comparatively limited period since the operator upon devitalized teeth regarded himself extremely fortunate if he succeeded in getting these teeth prepared for filling without an attack of pericementitis, and the danger was always imminent of an abscess with all its accompanying unpleasant

conditions. The past decade has witnessed an entire change in this respect, and I wish to occupy your time for a brief period in a review of a portion of the work that has led up to this. It is well known that for an indefinite period little was understood in relation to this subject. The facts were apparent and clinically fairly comprehended; but no attempts were made to investigate the cause. The germ theory of disease began to claim attention; but, as you are well aware, it remained for years a theory, and not until the investigations alluded to were made, were we prepared to understand the true relations of a pulp to the surrounding tissues or the origin of putrefaction, the source of all the ills we knew so much about clinically and so little therapeutically. It would be impossible to state the number of years that first creosote and then carbolic acid held empiric sway over the professional mind. These two were the essentials in every dental medicine case and, with the tincture of iodine, held undisputed possession of dental offices until a very recent date. That the true action of these agents was but imperfectly understood is apparent from the fact that they thus held control for so long a period. The excuse for this state of things does not, however, longer exist, and no dentist is properly prepared to treat pathological conditions without a thorough comprehension of the whole subject, including the materia medica upon which so much now depends.

It has been said that while the origin of zymotic diseases has been more thoroughly investigated in the period named than in the prior centuries, yet the treatment has not advanced in equal degree. While this may be true in general practice, and while Koch may be able to demonstrate the bacillus of consumption and cholera, he nor his followers have succeeded in destroying these germs and preventing their ravages by any satisfactory agent. Prophylaxis is far in advance in this respect, and possibly the near future will demonstrate beyond a question that the future province of the physician and dentist will lie in preventing rather than in curing disease. The field is a wide and interesting one; but time will not permit elaboration on this point.

There was but little modification in the views of operators until the chemical changes occurring in putrescent pulps were examined into. Dr. Litch was the first, as far as I am aware, to call attention to these, and his intelligent description of the chemical relations of the decomposed pulp has remained as the basis of our knowledge on this question and a satisfactory solution of a hitherto difficult problem. This, coupled with the work of others,

notably that of Miller and Black, has led up to a complete change in treatment among the progressive, intelligent minds of the profession. The fact that micro-organisms are a principal factor in putrefaction, indeed, that that process cannot go on without them. simplifies treatment with the dentist. More favored than the general practitioner, he can adopt the Listerine method at once, and prevent the development of germs in the early stages. It needs no argument here at this late day to prove this fact. If we were not in possession of the work of the distinguished gentlemen alluded to, we would still have our clinical experience to fall back upon as conclusive in the premises. It is safe to assert with entire positiveness, that a careful destruction of low forms of life in a canal, and subsequent sterilization of any instrument used, and then final exclusion, by proper agents, of all germs, that inflammation of the pericementum is an impossibility, and with this judicious treatment alveolar abscess would soon be placed amongst the lost diseases in properly treated patients. If, then, micro-organisms are essential to putrefaction, and the products of this chemical change produces pathological conditions in near and remote tissues, it is clear that the only canal capable of being filled at once after removal of the pulp is the one destroyed by forceful measures, and the earlier it is filled the better. All other cases require treatment.

The antiseptic agents are now so numerous, and are increasing so rapidly, that I would simply weary you with a recital of all of them, and will, therefore, confine myself to a few. It must be borne in mind that a true germicide is not always the most satisfactory agent to use, at least not in my opinion. An agent that can be used ad libitum, though possessed of but low germicidal powers, is superior, at times, to such a one as mercuric chloride. Again, one should be selected which combines, with its inhibiting power, the property of retaining its place without change for the longest possible time. This is, doubtless, the great value of iodoform in canals, that it cannot be broken up, but will retain its positive action for months and, possibly, for an indefinite period. Quinia, while weak in antiseptic qualities, is also of great value clinically, from its power of inhibiting pathogenic forms. number of antiseptics has become so numerous, and are constantly being added to, that it is difficult to arrive at correct opinions in regard to their relative value for dental purposes. Prof. Miller, as you are aware, has done good work in this direction, and I quote eleven of these in the order of value:

Mercuric Chloride. Nitrate of Silver. Iodoform. Naphthaline. Iodine. Oil of Mustard. Permanganate of Potassa. Eucalyptus Oil, Carbolic Acid. Hydrochloric Acid. Phenylic Acid.

The following are some that have been found valuable clinically: Resorcin, boric acid, naphthol, hydronaphthol, a preparation from B. naphthol, hydrogen dioxide (peroxide of hydrogen), thymol, quinolene, iodol, eugenol, eucalyptol, sanatas oil, salacylic acid, quinia, and heat. Many others, old and new, might be added, but I have preferred to give only those that have been thoroughly tested in pathological conditions of the mouth. Those named have quite different properties, and must be used with an intelligent conception of the object expected to be attained, as well as to their escharotic and possibly toxic qualities. The practical illustration of treatment in my hands is as follows: the canal is thoroughly injected first with peroxide of hydrogen as preliminary. This powerful oxidizer of organic matter prevents possible injury in cleaning out the debris of pulp tissue. The instruments used are passed through the alcohol flame to sterilize them. The canal is then thoroughly washed, either with mercuric chloride solution, 1 gr. to 4 oz. of water, or what I prefer, a naphthol solution, as follows:

 B Hydronaphthol
 gr. ij

 Alcoholis
 oz. ss

 Aquæ destil
 oz. iss. M.

 Sol. filtered.

This is a very strong preparation, and should be used with caution to avoid irritation of the mucous membrane. It is not an escharotic, but exceedingly irritating. The next application is either iodine in crystals, as recommended by Dr. Litch, or, what I prefer, iodoform in the form of a paste.

Iodoformigr. j
Zinci oxidigr. vj
Acidi carbolici, 25 per cent. solq. s. M.

This retains its character, as previously stated, for an indefinite period, hydrogen sulphide having no effect upon it; differing in this respect from iodine, for the latter breaks up H₂S into hydriodic acid, sulphur being deposited. Whether iodoform acts through its strong and persistent vapor or purely through its antiseptic properties is not understood; but probably through both, for,

according to Bartholow: "The vapor of iodine, like chlorine, but in feebler degree, decomposes sulphuretted compounds." While I have made some efforts to determine the effect of iodoform chemically, its action in canals, in putrefactive conditions, still remains uncertain. Clinically the results are entirely satisfactory. The objection to this agent is its penetrating, lasting and very disagreeable odor. This may be removed in part by some of the essential oils; but I prefer to use it with the least possible admixture. Other substances have been introduced to take the place of this, as iodol and iodide of bismuth; but my experience does not warrant me in giving them equal place to iodoform. The paste is covered with a pledget of cotton saturated with a strong antiseptic of non-toxic character, as thymol or hydronaphthol in solution, and then followed with a temporary stopping of cotton and wax, sandarach and cotton, or gutta-pereha. The latter, if used, should be left with a vent extending from the cotton to the surface of the filling to serve as an outlet for any excess of gas. When all odor of putrefaction has ceased, the canal is generally considered to be prepared for filling. When it is remembered that the entire dentine is permeated throughout with tubes, and each of these contains organic matter in a state of decomposition, and that the central canal is the common outlet for the drainage, it becomes a serious question whether it is ready for filling; certainly not without further treatment. As it is manifestly impossible to reach the contents of these tubuli except by imbibition of fluids, the selection of which must be based on certain qualities, it is clear that an antiseptic, however powerful, will not accomplish the object aimed at. It will necessarily be temporary in its results, and the discoloration of the body will be the final effect. The desired object can only be obtained by some agent or agents that will change the character of the decomposed tissue in the tubes and render it undecomposable. This will be found in the coagulators, and, of these, the chloride of zinc stands at the head of the list. This, from its affinity for moisture, will penetrate deeply and persistently Putrescence cannot go on. Albumen thus treated and exposed to the atmosphere has remained unchanged for months. The canal is first closed at the apical foramen, at the shoulder, with either a small piece of cotton saturated with carbolic acid, or, if possible, with a small piece of gutta-percha. Cotton, saturated with chloride of zinc in solution, is then passed into the canal and allowed to remain there for several days. The object of the cotton or guttapercha at the foramen is to prevent the action of the chloride on

the pericementum. This action may be desired at times. Hence its use requires judgment. The further treatment must be governed by each individual case.

This article would be incomplete without noticing the plan of using compressed heated air, introduced by Dr. H. C. Register, of Philadelphia. In the treatment of canals it is unquestionably of great value and hastens the operation. Dr. Register states that it effectually destroys all germ life and that a tooth can be filled with entire safety at once after heated air has been forced into the tooth under pressure. The only question that I entertain in regard to it is, that if the heat be carried to a degree sufficient to destroy micro-organisms, it may possibly weaken the tooth by burning or drying out the organic matter of the dentine, and especially of the enamel. This result followed the use of metal for filling, flowing at a low heat as Wood's metal. The crowns were so much weakened that the walls frequently fell from the filling.

The filling of these canals is so well understood and so thoroughly exhausted of all novel features, that it might be omitted; but there are some points I wish to refer to briefly. Gold, tin and gutta-percha possess valuable qualities and have each in their way given excellent results. Argument seems to me to be wasted in attempts to discuss the relative merits of these materials. With suitable conditions each has its value and will preserve the tooth from the irritation of septic poison; but may not and, if my reasoning be correct, cannot prevent discoloration as neither of them can affect the organic tissue of the tubes. For the reason given under the consideration of chloride of zinc, I prefer the oxy-chloride of zinc for filling canals.

There has been adopted in recent years a mode of treatment that seems to me to require special notice; as, in my opinion, it is not only unscientific but reprehensible. I allude to the filling of canals with cotton saturated with carbolic acid. The advocates of this practice contend that success justifies the means adopted. This, if it were true, might be a satisfactory argument; but it has yet to be proven, while there are many facts in direct opposition to any such claim. Carbolic acid, as well as all germicides, has a limit to its power, the effect in time ceasing. It is true that both carbolic acid and creosote are coagulators; but they act very slowly in this direction and it is questionable whether either of them will change to any depth the contents of the tubes. With the loss of germicidal power there comes a time when the cotton will become offensive and a constant element of danger to the tooth. Cotton is an

efficient filter and is, therefore, valuable to prevent the ingress of the micro-organisms from the atmosphere; but is not to be relied on for continued duty in a tooth canal. It is not a serious matter in the form of a small pellet, saturated with carbolic acid and placed at the constricted portion of the canal as it enters the apical foramen and may there have a certain value in protecting the pericementum; but beyond that I regard it as objectionable.

The importance of pulp treatment in connection with pericemental inflammation has not, that I am aware of, been noticed as its importance demands. The pathological state which we denominate pericementitis is the result of pulp disorganization by some of the well known forms of destructive lesions. To undertake the reduction of this inflammation, locally or combined with systemic treatment, must result in partial or complete failure if no attention be paid to the pulp. Inflammation of the pericementum at the apical foramen, of a pathological character, is certainly impossible unless the central and formative organ be first involved. The cause of the lesion of the investing membrane lies in the canal and whether it be acute pulpitis or from decomposed particles, the treatment must begin with the canal and this must be accorded the careful management heretofore described. The satisfactory results growing out of this treatment has robbed this once cause of anxiety of nearly all the difficulties and reduced the loss of teeth, in my hands, to a small fraction of former years.

The conclusions arrived at in this paper may be condensed as follows:

1st. That in the forceful removal of the pulp we have the only condition that favors immediate filling.

- 2d. That death by escharotics or by inflammation necessitates treatment.
- 2d. That antiseptic agents will not prevent discoloration of dentine and, therefore, an agent must be used to change the organic tissue in the tubes into an insoluble compound.
- 4th. That while gold, tin and gutta-percha are each good for filling canals, oxychloride of zinc is to be preferred for its valuable and persistent coagulating property.
- 5th. That pericementitis cannot be successfully overcome without first treating the primal cause, the diseased pulp, antiseptically.

Reports of Society Meetings.

AMERICAN ACADEMY OF DENTAL SCIENCE.

Report of Monthly Meeting, Wednesday Evening, February 6th, 1889.

A NEW METHOD OF EXCISION OF THE INFERIOR DENTAL NERVE, WITH CASES.

BY THOMAS FILLEBROWN, M.D., D.M.D., BOSTON.

In connection with the operation which I wish to describe, I report two cases which have lately occurred in my practice, and in which this method of operating has proved a complete success in my hands.

Case I. Mr. H-, aged 56, in February, 1886, had his left inferior third molar extracted. (The first and second molars had been removed some years before.) At the time the operator thought that a fragment of the root was left in the jaw. Soon after this the patient became subject to attacks of pain in the left mental region, recurring at intervals. These spasms gradually increased in frequency and severity, and in October, when I first saw the patient, pain was rarely absent for more than five minutes at a time. The slightest irritation would cause the most intense pain. A current of air, warm or cold, contact of food with the teeth of the left side, or even the pressure of the lip by muscular contraction, would bring on these violent attacks. This long-continued suffering and inability to take proper nourishment showed their effects in the haggard, distressed look of his face and in his general physical condition. Aside from this the patient was apparently healthy.

Examination of the depression left by the extraction of the tooth revealed no evidence that a piece of the root had remained in the jaw; and the absence of tenderness, swelling, or redness indicated a normal condition. In one of the bicuspid teeth the pulp was dead, and treatment was directed to this in view of the possibility that the cause might lie here. Measures in this direction, however, had no influence over the pain. The failure of all treatment to afford relief to the sufferer satisfied me of the correctness of my first suspicions, namely, that the case was one of chronic inflammation of the inferior dental nerve. Excision remained the only proper course to pursue, which was readily agreed to by the patient.

Case II. Miss S——, aged 35, had been suffering several months from spasmodic neuralgia in left side of lower jaw and face, beginning with periodic attacks of slight pain, which gradually became so severe and frequent as to incapacitate her for work. Patient was anæmic, poorly nourished, and the nervous system showed a marked reaction to the long suffering. With the exception of the second and third molars the lower teeth of the left side were present and in good condition, offering no suggestion as to the cause of the pain. A general tonic treatment produced no appreciable effect.

Diagnosis: Chronic inflammation of inferior dental nerve, or pressure of tumor. Excision was decided upon.

In choosing a method of operating for these cases, it appeared to me that the nerve could be reached through the mouth, avoiding the ugly scar which results from the usual manner of operating from without through an incision along the ramus and body of the jaw. In the case of a lady especially this point is of much importance.

My plan was to cut down into the jaw through the site of the extracted teeth, and in this way expose the nerve and remove a section of the nerve through the opening. Confident of the practicability of such an operation, I determined to give it a trial, and as these cases will show the results were more than satisfactory.

The details of the operation were the same in both cases, therefore I have reserved their description for the sake of convenience.

The most important instrument used in the operation was made expressly for the purprse by Messrs. Codman and Shurtleff of Boston. The simplicity of the instrument is one of its principal features. It corresponds practically to the ordinary trephine, with the exception of the absence of the axis pin for fixation and its being adjusted to the dental engine.

In case I, the inferior molars of the left side being absent no teeth had to be extracted. Ether was given in the operating chair. The position of the head for operating was that which it is usually made to assume in ordinary dental operations upon the inferior teeth, namely: The head thrown somewhat forward and the chin approximated to the chest. Being so well accustomed to working under these circumstances, I found it unnecessary to use the gag, which really would have been more of a hinderance than a help. I removed a sufficient area of soft tissue immediately posterior to the second bicuspid. And having adjusted the trephine to the engine, which was managed by an assistant, the jaw was firmly supported

from below with the left hand and the trephine was sunk perpen dicularly through the cortical and cancellous tissue until the plane of the nerve canal was supposed to have been reached. Directly behind, and in a line with this first opening a second and a third were made of the same depth.

The small pieces of the bone separated by the trephine were removed and the thin walls between the trephine holes broken with a large burr. Thus a longitudinal wound was made extending in the axis of the jaw, three-eighths of an inch wide and one inch in length.

Upon clearing away the blood clots and debris from the bottom of the opening, it was found that the nerve canal had not yet been reached. The trephine was again applied at each extremity of the wound, and sunk until the soft fleshy sensation transmitted to the hand signified that the nerve had been struck.

After removing the intervening bony tissue by means of the burr, a section of the nerve was then easily extracted, leaving the smooth, glistening nerve canal visible at the bottom of the cavity. After stopping the hemorrhage, which was slight, the wound was irrigated with a weak solution of carbolic acid. The operation was lengthened by the necessarily interrupted anæsthesia, and more in Case I, on account of the patient being addicted to the use of stimulants. The actual time of operation was about twenty minutes in each case. In Case I, the absence of three molars furnished abundant room in which to operate; but in Case II the presence of the first molar limited the field considerably. As regards the dressing of the wound, there is one point which I consider worthy of particular mention. The great difficulty with which wounds connected with the oral cavity are kept aseptic and dry after operation renders the treatment very unsatisfactory, and gives disappointing results.

The failure of my first dressing, iodoform and ordinary cotton tents, necessitated a substitute which would exclude the moisture, food and secretions of the mouth more effectually. Accordingly a pledget of cotton was taken, corresponding in size when slightly compressed, to the cavity in the jaw, and saturated with an alcoholic solution of gum sandarac. After having thoroughly dried the wound, and applying iodoform, this tampon was packed in forming a plug which filled up the cavity completely. The sandarac, of course, hardened immediately, and the wound was thus well protected from the food and fluids of the mouth. I found that this dressing worked admirably, and only required changing at inter-

vals of two days in the beginning of the treatment, and later even after four days the wound would be found clean and free from disagreeable odor. At each dressing the tampon was made a little smaller. This dressing I would strongly recommend in the treatment of wounds of the mouth where its application is practicable. It forms a complete protection to the granulatory surfaces, and its application is very easy.

The results in these two cases were all that could be desired. Immediately after the operation in both instances the relief from pain was complete and permanent. There followed, naturally, insensibility and numbness of the teeth and face on that side; but that improved gradually in the course of time.

The excised portions of the nerves were examined by Dr. Irving Kimball, of Portland, and in the first case no pathological change was discovered, leaving the cause of trouble still very obscure. In the second case there was found a distinct tumor in the excised portion, with evidence of chronic inflammation in the surrounding nerve tissue.

In the operation which I have just described, one cannot fail to see the advantage over the external incision and chiseling the way to the nerve canal; and, without comparison, its merits are obvious to those who are accustomed to operate in the oral cavity. The only possible disadvantage in this method is the interrupted narcosis which, of course, lengthens the operation; but to my mind the avoidance of the disfigurement of the face and the salvation of the facial artery far outweighs this slight objection.

President Wilson—Gentlemen, you have no doubt all listened with a great deal of interest to Dr. Fillebrown's paper, and the subject is now open for discussion,

Dr. Chandler—How do you differentiate nerve ache from all the other aches that teeth are subject to?

Dr. Fillebrown—In the early stages of the trouble it is quite impossible to differentiate between them, but as the disease progresses the spasms of pain caused by the neuritis are more lancinating, more frequent, more intense, and also more completely intermittent than toothache.

Pain caused by a tooth is excited by only such extraneous circumstances as affect the teeth themselves while the neuralgia is excited by causes which affect only the surface as a current of air upon the face, or a slight touch as of a handkerchief even without pressure.

Tooth pain will generally sooner or later become located in some particular tooth which is the cause of it. Neuralgia persists in the mental region without any more definite localization.

Toothache seldom or never exhibits itself in the mental region. Neuralgias, very generally, if not always do.

Exclusion of the teeth as a cause by careful examination is an important matter in diagnosis.

Dr. Wilson—Are you aware of this operation ever having been performed inside the mouth before, or is it your own idea?

Dr. Fillebrown—It has been excised at its entrance into the posterior dental foramen, but never to my knowledge through the site of the molar teeth.

Dr. Chandler-How long a piece of nerve did you take out?

Dr. Fillebrown-About one inch.

Dr. Wilson—After having excised the nerve, what was the effect upon the other teeth in the lower jaw?

Dr. Fillebrown—The teeth were not changed in any respect observable.

Dr. Brackett-It seems to me that the paper which has been read before us describes an operation which is fairly to be considered a new operation, and that very high credit should be given to Prof. Fillebrown. Of course, we have all well known for years of the surgeon's procedure of removing a section of the inferior dental nerve by exterior operation; but to me the external operation seems comparable to this, as the external splint for fractured inferior maxilla is comparable to the Gunning interdental splint, or as lithotomy is camparable to litholopaxy. Vesical calculi had been removed through external incision from very early days in the history of surgery. Indeed, stones had been broken up in the bladder, and by a succession of hazardous operations at hazardous intervals gotten rid of; but it remained for a Bigelow in recent times to devise suitable apparatus, and show the feasibility and safety and great advantage of crushing the stone and withdrawing all its fragments through the natural passage at a single not long sitting. Prof. Fillebrown has devised instruments and accomplished the removal of a piece of nerve trunk in a way so different from the way in which that operation had previously been performed, and possessing such great advantages over it that it is justly to be called a new operation, and we should give him honor.

The cutting out of a piece of nerve trunk for the lasting prevention of the performance of its functions was years ago in a great majority of cases found necessary for success, simple cutting not being usually sufficient. In this connection the injury which the inferior dental nerve may sustain in some rare instances of difficult extraction of lower molars is interesting, and some experience of that kind which I have had I hope to publish sometime. that experience I should expect after such an operation as Dr. Fillebrown has performed, if relief from neuralgia at once followed. that that relief would be permanent. So far as I have knowledge of these operations, the mobility of the jaw is never in any way interfered with by them, the paralysis induced being purely sensory. I should not expect this incapacity for sensation to remain complete permanently, but I should think that there would always be a lack of full normal sensation,—a difference from that of the other side. I do not believe any collateral nerve supply can ever come to perform the full functions of the nerve from which a cross section of considerable length has been removed. This might be an objection to the operation if it were to be performed for ills of slight and passing moment; but in those cases in which the operation is markedly indicated the relief is so great and comes as such a boon of peace and blessing that the sensory paralysis, limited in extent and partial in degree, is to the patient comparatively a thing of no consequence.

I do not think the diagnosing of cases calling for this operation quite so difficult or uncertain as some of the speakers have intimated. There must be, of course, a most careful exclusion of all such neuroses existing within the teeth themselves as could give rise to the symptoms and be readily and only appropriately treated by less heroic measures—by the ordinary procedures of the dentist. We should endeavor also to exclude those cases of neuralgia which, dependent primarily not upon local lesion, but upon systemic impoverishment, need treatment along a quite different line. With these groups excluded there remains a class of cases most likely explainable by the existence of some such neuroses as may be hopefully traced by the operation of resection, if that resection can be made to reach either the exact seat of the lesion, or to cut between it and the centric portion of the sensory system; and these are cases to which very little hope can be afforded except through resection.

In these cases there are usually such characteristic indications as tend to add positiveness to the diagnosis perhaps first made negatively. In the case of an old gentleman whom I have been seeing in recent months, the teeth from repeated searching examination, including section of some which have been extracted are

believed to be intaresically free from any source of offence. After an interval of quiet, paroxysms of agonizing pain are excited by slight movement—the attempt to smile, to speak, to cough, to drink, to take food, the light touch of a finger against the skin of the face, the beard, the moustache, or any other similar part.

While in all of these cases it is desirable to make the diagnosis as accurate and positive as possible, there is a point in nearly all difficult diagnosis which stopping short of completeness extends sufficiently for practical purposes. If we are able to feel pretty confident that the trouble is of a nature to be relieved by resection. the condition of the patient and all other circumstances making no contra-indication, we are justified in making that resection, and all the more so since Prof. Fillebrown has shown how it may be done with no external incision and no after disfigurement. The number of these cases is, to be sure, not larger, and yet I apprehend that few busy dentists pass a single year without seeing one or more instances in which the propriety of this operation is at least a matter for consideration. When they come, if relief may be afforded by it, we should be thankful. Personally I am most grateful to the reader of the paper for the suggestion and the testimony which he has given before us.

Dr. Williams—I have read in medical journals descriptions of operations with such instruments as Dr. Fillebrown has mentioned, but they were larger. Dr. Fillebrown was bright enough to have an instrument no larger than he wanted to use.

Dr. Goodwillie, of New York, showed me, at one time, a number of instruments made for him, among them a small trephine and various burrs and cutting instruments. I do not mean to detract at all from Dr. Fillebrown's paper, his ingenuity and success, but I think that we had better not be too forward in claiming things to be new.

Dr. Fillebrown—I thank the gentlemen for their kind words of appreciation. I hope it is not entirely unfounded or unmerited. I wish to hedge certainly against having anything claimed for me that I do not claim for myself. All I claim for this is that it is a new method of incising the inferior dental nerve, and that I shall claim right here. I took a great deal of pains; and, among other things, I had this library here gone through, not only in its dental department, but in its surgical department, and I for years have been looking after it, and I haven't been able to find any record where it has been done in anything like the same way.

In the first case the three molars were gone, and I had a grand opportunity to work. In the second case only the second and third molars were gone; the first molar was present, and I performed the operation without injuring that, and through the site of the other teeth.

If I should meet a case where only the third molar was gone, or there were none gone, I should simply remove the third molar, and I think I would cut out three-quarters of an inch.

I should try it, but I should not take the second molar until I had failed in the other case.

Dr. Taft—How do you control the bleeding?

Dr. Fillebrown—It controls itself. There is another question arises from it; should it persist in bleeding, you would plug the canal of course. But in these cases it didn't; the contraction of the muscles stopped it.

Dr. Banfield then presented a regulating appliance which, after placing, had without alteration or change moved a second superior bicuspid into line in twenty-one days. He recommended it for its simplicity and efficiency. Adjourned.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

TENTH ANNIVERSARY MEETING CONTINUED.

Discussion on Dr. Truman's Paper on The Pulp, and Treatment of Pulp Canals.

Dr. S. G. Perry, New York City—There is little I can say except to commend the paper in every particular. From microscopic observations of the contents of pulp canals, I find that when first opened, if there is a disagreeable odor, there is always a very lively condition microscopically. As such teeth are the ones from which trouble may arise upon disturbance, it does not seem too much to assume that microscopic life may be directly or indirectly the cause. Whether such odors are due to the rapid multiplication of germs or to chemical action resulting from such multiplication, is hard to say; but it tallies with clinical experience to expect disturbance when such teeth are opened if the most prompt and active antiseptic measures are not resorted to. It does not seem right to me to attribute the trouble to the contents of the pulp canal alone. We must look further, for, as Dr. Truman says, there is a large proportion of once living matter in the tubuli themselves, and to fill the pulp canal before such animal matter has been sterilized seems to me unwise treatment.

As to the removal of the pulps of teeth that have never been inflamed—if they are distroyed at all—I think there can be no doubt, on general principles, that it is well, if there is a healthy condition, to fill the canal as quickly as possible. If it is left open particles of food, mucus, etc., get in—substances that will produce the very trouble the pulp itself will produce if not removed; so it is best to close the teeth as quickly as possible.

The best method of filling the roots of teeth seems to be an open question. For many years I have been in the habit of using the gutta points. I believe they originated in my office. I use them as much as any other means, because it is possible to carry thin points to the end of the roots, and by the solvent action of chloroform get a perfect fit to the walls of the canal, as well as to be more certain of closing up the open mouths of the tubuli. My objection to oxychloride is that the air becomes confined before the instrument, and it is very difficult to get the filling to the end of the root. This will be easily shown by the attempt to fill the roots of teeth out of the mouth, or better still, the closed end of glass tubes drawn down to resemble the shapes and sizes of the pulp canals of teeth. In filling the canals of teeth there must be no open spaces left, as they become receptacles, and being filled by infiltration become as great a source of danger as an unremoved pulp.

And yet I consider that there is, after all, an objection to gutta-percha. It is in the fact that it is somewhat absorbent and that it is not antiseptic. Sometimes when removed, after many years, there will be a disagreeable odor from it. The filling of a pulp canal should be as indestructible and non-porous as possible. I question therefore if it is not true, as claimed by Dr. Jack in the "American System of Dentistry," that the very small part of the pulp canal near the end of the root can be filled as accurately with gold as by any other known means.

I have in the last few years many times filled the tips of roots with gold in the manner described by Dr. Jack, and always with the feeling that I had made a close tight filling, free from pits and holes. After reaching the large part of the canal I see no advantage in using gold. In other words, when I can be perfectly certain of filling with oxychloride of zinc without danger of air bubbles, I know of no better substance. I suppose I fill the tips of the canals about as often with gold as with gutta-percha, but the larger parts of the canals I almost always fill with oxychloride of zinc. Drying the tooth as much as possible I saturate the root with chloride of zinc in the hope of sterilizing the tubuli, and then

fill the canal with the oxychloride of zinc. These methods are applicable to good healthful teeth. The roots of teeth that have been diseased I often fill in such a manner that the root filling can be removed without too much trouble. For such cases I often use tapered gold wire filed to fit the root fairly, and reaching if possible to the apex. This I plunge through the oxychloride or the solution of gutta-percha, as the case may be. The large end of the wire I notch or bend over in the form of a ring to facilitate removal in case of need. Although I do not put in fillings expecting they will be removed, yet it is comfortable to know that in case of need it can be rather easily done.

Dr. Joseph Head, Philadelphia—I do not come up here because I want to speak, but because I have something to say. I stand here as a person who fills roots with cotton, and I wish to explain my reasons for so doing. If I am wrong I will gladly change my course, but at present my sole desire is to see both sides of the question represented.

It has been justly said by the last speaker that oxychloride of zinc, phosphate of zinc and gutta-percha are porous; that taking up the fluids of the blood they become saturated with putrefactive matter. Gold has been lauded as a root canal filling, and when the apex of the canal can be readily reached, gold certainly can be legitimately used, as it makes a thoroughly tight joint. But it is universally known that the roots of molars usually are flat and tortuous, that the accurate adaptation of either gold or gutta-percha is impossible. And when the utmost care has been used, and even when the canal has been thoroughly filled, the risk of alveolar abscess is always present? There always is a strong probability that the outer portion of the apical foramen is unfilled?

If, therefore, recognizing these facts, a dentist fills a canal with an irremovable filling, should trouble arise, and the patient return, the uncomplimentary remarks of the patient will have some degree of justice.

The dentist is in a bad scrape; he does not know what to do; the tooth is jumping; the patient is in anguish and wishes to be relieved, and the gas is imprisoned at the apex of the root, and the unfortunate practitioner seizes his engine and proceeds to vent the aching tooth. He has the unpleasant task of perspiring for two or three hours, but what is worse he almost kills his patient.

How much better would it have been both for him and his victim, if instead of the irremovable filling he had inserted a cotton

dressing, soaked in carbolic acid. Had the cotton been used, two minutes work with a spear pointed drill would have given the

patient almost instant relief.

Dr. L. Ashley Faught, Philadelphia—I have in my practice seldom filled a root with anything other than cotton, and, if my experience with it is as favorable in the future as it has been in the past, I shall continue to follow the same line of practice. Dr. Head has presented to you the reasons why he likes to use cotton fillings, and I agree with every sentence.

There is a little word of caution, however, which might be well mentioned in this relationship—that it is important to be careful in choosing with what you saturate your cotton. There are drugs which certainly seem to disintegrate the fibre of the cotton, and if you should experiment first with one thing and then another, be careful, for upon removal you may find the cotton broken up and in such a shreaded condition that it will be worse than boring out a gold filling. It is almost impossible to get at the apex.

My choice of dressing is the one suggested by Dr. Kirk: Iodoform disguised with oil of cinnamon. It seems to be the most satisfactory thing for a final filling; and when the cotton is packed thoroughly and tightly into the root, it is as solid and impervious

as anything can be.

Dr. Geo. S. Allan, New York City—I like a bold man very much, and therefore I am very much pleased at the stand taken by the two gentlemen who last spoke to you in favor of that much abused cotton filling. I have used it for years in certain cases, and my success with it has been as favorable as with any other material, though I have used gold largely; in fact, uniformly use it where a root can be readily filled or gotten at, cotton saturated in some strong antiseptic, such as oil of cloves, or better still, tyron, can be packed more thoroughly into a fine root canal, filling it up more perfectly than any other material that I know of; and I have taken out cotton that has been saturated in tyron, packed into a root for 15 months, and it was just as sweet as the day it was put in, an an almost imperceptible odor of tyron could be distinguished.

It behooves us to be very careful in condemning our material in use as root filling, owing to popular prejudice. There is a prejudice against cotton, and it is talked very slightingly of. Pure cotton, if packed into canals, and then excluded from the moisture of the mouth, makes as perfect a filling, I may say, as gutta-percha. It is not as porous, and therefore is not as subject to the changes that gutta-percha is liable to. One of the best methods of preparing cotton for root filling purposes is as follows: Soak it for some time.

beforehand, in one per cent. solution of mercuric bichloride. Then dry it carefully. Then before using it wrap it carefully around the proper broach, taking pains to employ only cotton enough to fill the canal, and give it a solution of resin in ether, dry off with bibulous paper the excess of resin, and then pack it into the canal. Cotton so prepared is almost indestructible. Bacteria cannot obtain a footing in it or grow in its meshes. It is taken for granted that all root canals are sterilized before filling, no matter what the nature of the filling material employed. I advocate cotton only as one of many useful materials available for the purpose.

Dr. J. N. Crouse, Chicago—I am a little disappointed in coming back to this old city, where I received the first part of my dental education, and listening to-day to my old teacher, to find him advocating about the same practice and holding the same views that he did twenty-five years ago, not having advanced any in this one direction. I cannot agree with him in his views on capping pulps, for if I understand his meaning correctly he condemns almost in toto pulp capping. What he said on the subject was little, but enough to show that this was his view. I stand here an advocate of pulp capping and claim a successful practice in this line. If the gentleman is not able to cap pulps, I am and successfully, and consider the destroying of pulps and filling of roots the last thing to do. I formerly filled roots with gutta-percha and gold, using a little gutta-percha in end of root, which does not prevent me from forcing the gold as far as it will go, the gutta-percha occupying the space which would otherwise be left vacant, unless some plastic was used.

I should cap the pulps of all teeth when the dentine is sensitive; that is when it responds to scraping of excavator and gives off sensation, which I believe to be one of the best tests of a healthy pulp. I should apply carbolic acid freely getting a complete coat of coagulated albumen over the point of exposure, cap with oxychloride of zinc, being very careful to apply the capping in a skilful manner, believing it to be one of the most delicate operations in dentistry, and being sure to have a good solid base for the cap to rest upon, having removed sufficient of the softened portion to make sure that the cap rests solid, and filling over this with whatever material seems best for the permanent filling. As these were my views when I came here, I do not expect to go home and apply arsenic or any other destructive agent to pulps, but shall continue to cap them, having great faith from a long and successful experience in this line of practice.

I do not wish to be understood as claiming that all pulps that are capped remain alive; a certain per cent. of them die, giving no trouble to the patient, but remaining entirely comfortable and the teeth not discoloring; and only by applying an extreme of cold and heat would you know the pulp was not alive.

Another per cent. will give trouble, and the patients come back to you, or to some one else, after capping, and will receive the treatment as laid down on the paper, which I consider sound both as to manner of getting ready and the filling, except perhaps the use of oxychloride instead of gutta-percha; but I think I would as soon risk one as the other.

There is one thing that is lost sight of in deciding between capping or destroying pulps, and that is that quite a per cent. of teeth, even when the roots are filled as well as can be, frequently give trouble.

I did not expect to come here and hear of so many successful operations by filling the roots of teeth with cotton. I thought that practice had died out long ago. This cotton practice has a redeeming quality spoken of by one of its strong advocates here to-day, which is, by leaving the ends sticking out, it can be removed quickly when the tooth gives trouble; a very wise precaution which will be often needed.

Dr. C. E. Francis, New York City—I listened to Prof. Truman's paper with much interest; it contains a great deal of sound sense. The subject is an old one, but at all times important and interesting. Dr. Turman said so little regarding the capping of pulps that I did not suppose his subject covered this mode of procedure. I imagine that but few of us here present think of devitalizing a freshly exposed pulp. I have for many years been in the habit of capping pulps when newly exposed, and have written several papers on the subject giving my reasons for so doing. As regards the matter of devitalizing freshly exposed pulps, I believe the time has passed for this sort of practice. Prof. Turman, however, referred to "sick pulps" or pulps in a pathological condition, and I fully agree with him in his treatment of such cases, for I have but little faith in the restoration or salvation of pulps that are sickly or in a partially congested condition.

As regards the material for filling root canals, I have many times heard it argued that it made little or no difference what substance was employed, if only the canals were properly prepared before receiving the filling; and it seems to me that this is about the case. Gold, tin, gutta-percha, wood, cotton and the zine stoppings

have all been used with success. Cases have come to my notice where roots filled with cotton have remained in good condition for many years. A prominent and excellent dentist of New York has used cotton as a root filling in very many instances, and a number of teeth so treated have come to my hands. I had occasion to remove the fillings of several of these teeth, and found the cotton thoroughly packed and apparently as clean and odorless as when introduced. Packed in this manner the cotton would not be apt to absorb moisture from the foramen at the end of the root. Success in root fillings is in great part due to the preparation of the canals, much more so then in the choice of materials used. They should be thoroughly cleansed of all debris, washed well with tenid water; disenfectants, or antiseptics injected, and made perfectly dry with warm air. I never boast of my ability and in such cases am not sure of perfect results. But as regards freshly exposed pulps, I would always endeavor to save their vitality. and if successful but once in three cases it is worth our effort to try. In the majority of cases, however, where the pulps are healthy I believe they can be saved.

Dr. W. A. Atkinson, New York City—I neverallow my pupils to kill pulps except where they cannot control the case, as in persons who want to travel, and where pulp stones must be removed to secure usefulness of the root.

As to the paper the doctor said squarely that when pulps came to him exposed, he let other people take care of them. The time is upon us when pathological chemistry must be accurately studied before we can grasp the situation and do our whole duty. We know that chloride of zinc and oxide of zinc mixed together produce a hard body, and whenever any body is crystalized with a great number of crystals, there must be spaces between. It is the zinc that acts upon the fibrils forming a "hydrochloride of albumen" in the root. When the root is well filled with any fit substance, it should never be removed. Because if you have a tooth filled to or even a little beyond the foramen, the end becomes encysted, and there is no occasion to remove it. There is a great deal that goes to make up success that is not scientific; though it is, at the same time, the very highest science occulted.

Now, with regard to pus and the process, we heard to-day that it was the leucocytes under the inflammatory process, escaping into the cavity of the abscess that become pus corpuscles. If alive until next June, I hope to be able to put this matter straight, as I am preparing a paper on the origin of pus. It is impossible for

leucocytes to pass the hardened congested tissue of an abscess in sufficient quantity to supply the pus to fill it. A retrograde molecular metamorphosis melting and breaking up the tissue elements is the antecedent of an abscess in every single instance. There must be living tissue and micro-organism in the neighborhood of the debilitated protoplasm before there can be any pus. Abscess is local and dependent upon a deterioration in the juices of the flesh (the substances ready to be appropriated by the process that we call nutrition). I merely name these points to show how far and endless the discussions could be if fully elaborated.

Dr. C. E. Francis, New York City—In my previous remarks I hope I did not give the impression that it was my custom to fill root canals with dry cotton. The idea intended to convey was that success depended more in the preparation of the canals than in the filling material. In conversation with the late Dr. Varney, many years ago, he remarked that he considered oxychloride of zinc the best stopping for roots. He believed it possessed antiseptic properties and would remain permanently. There is some difficulty in introducing this material into the canals. Small fibres of cotton wound around a broach answers a good purpose for carrying the zinc paste into the roots.

Dr. W. H. Dwinelle, New York City—Dr. Perry made the remark that I had had an experience which antedated the experience of many on the subject of filling root canals, and I was about to say that also with reference to the capping of nerves.

I think it was in 1842 or 1843, I was constrained to advocate the retaining of the vitality of the nerves of the teeth in cases of deep seated caries. It was customary with many of us, and with the profession generally, at that time to excavate a cavity until all the decay was taken out, and when the decay was deep and the dentine largely disintegrated, it involved the uncovering of the nerve; and according to the orthodoxy of the day, a nerve exposed must necessarily be destroyed; at that time I advocated the retaining the vitality of the nerve leaving this partially decomposed bone as a capping for it. I can show you to-day evidence to persuade you there were instances wherein this partially decomposed bone, allowed to remain, has been recalcified. It is the office of the nerve to deposit secondary dentine, and cover its retreat so that in extreme old age it is entirely obliterated. I was abused roundly for it, and in conjunction with the articles published on the subject, I was accused of leaving decay in the tooth, a very unpopular thing especially as our operations are designed to save teeth from decay.

Now, in regard to exposure of the pulp, I was, perhaps, one of the earlier dentists who recommended saving the nerves of the teeth. I have been successful in a large majority of cases. I have within a few weeks examined some teeth whose nerves were exposed and capped away back in the forties, and found them entirely intact and alive and covered with a calcified capping. With regard to filling nerve canals, I think I have the advantage of the experience of those as far back as Hudson and Maynard. Their methods are familiar to you all. My method of filling nerve canals, if it is a case when it is absolutely necessary for it to be destroyed, devitalize it, remove, medicate and then fill at once. If it is an old tooth, dead and charged with decomposed matter, adopt methods to absorb it out, treat thoroughly until you are satisfied the fibriles have been thoroughly coagulated, sterilized and inert, then fill it thoroughly.

Then for years I filled with gold, though not so much now, not the entire canal. I roll my gold on a Swedish broach so that it forms a sort of attenuated cone, measured the length of the root, and then take a Swedish broach and made a slight right angle at its extremity. It is then made to slip down until it has passed the foramen. This can readily be appreciated by the delicate hand of the manipulator. It is then marked and drawn out, when the rest of the filling instruments are gauged by it.

It was my custom to fill nerve canals, until recently, entirely with gold—always with gold at the extremity I rarely have any trouble with teeth; when I do, I consider that I have not done my work thoroughly; that I have not allowed sufficient time between my treatment and filling. If I have any trouble, I do not remove the filling at all, but resort to external treatment with the drill. I do not think it is extremely painful. I simply put a drop of cocaine on the gum over the extremity of the root, and with a drill suddenly open, through the process, to the extremity of the root, and there I accomplish all that I could by taking the filling out. I rarely have trouble after this.

I am not in favor of the use of cotton pure and simple for filling nerve canals; if you use it in conjunction with resin, wax or oxychloride of zinc, the virtue of the operation must be attributed to these materials, and not to the cotton, which only facilitates their introduction. More depends oftentimes upon the intelligence, skill and delicate manipulation of the operator, than anything else; but you cannot hermetically seal a cavity with cotton alone.

Dr. James Truman, Philadelphia—I think, in justice to myself, and in response to my friend, Dr. Crouse, of Chicago, who says I have not learned anything in twenty-five years, that I should say something. I believe I have acquired something in that period and have, I am sure, passed through all the stages of capping, and have tried all recognized modes of treatment. He will, however, permit me to say that capping was not the subject of the paper, and was referred to only incidentally among others as the basis of my argument. But as this subject has been brought into the discussion, I wish to repeat that there are conditions where pulps may be saved by this process, and also pathological states where it is impossible to save them. I should be untrue to my convictions did 1 not recognize the fact of the possibility of saving pulps after continued exposure and irritation.

The point that I wished to make in the paper was not antagonism to cotton filling any more than to capping. While I oppose both as a general practice, there may be times when both may be a success. The reason given for its use, that is easily removed, seems to me a fallacious one. As Dr. Atkinson truly says, why do we wish to remove a canal filling that was put in to stay? I never remember a case where this seemed to be required that external treatment did not answer equally as well. A gold filling, to be of any value, must be packed in as solid as the mallet can make it. Nothing is, therefore, to be gained by attempting its removal. I do not want a filling that can be withdrawn. To make it of this

character implies a doubt and suggests a possibility.

That which I wished to call especial attention to, in the paper, was the condition of the tubuli of the teeth. The organic matter contained therein when left without treatment is followed, eventually, by discoloration of the tooth. I endeavored to impress upon you the necessity of placing something in the canal that will act upon the dead tissue in the tubes, and I suggested for this purpose chloride of zinc in solution. The well known property of this agent, as a coagulator, makes it an especially desirable agent in this connection. Its affinity for moisture will cause it to penetrate deeply, and where congulation is effected decomposition is impossible. This opinion is based upon clinical experience and to some extent upon microscopical observations. I have tested it so long that I feel every confidence in it, and do not pretend to fill a tooth before I have had the canal under the effect of this agent for several days, as the use of chloride of zine for this purpose is original and of necessity will need confirmation from others, I desired it should not be overlooked in the discussion.

In regard to the remark of Dr. Atkinson that the leucocytes, found in an inflamed pulp, where the product of metamorphoses, I have this to say, that I do not think we know enough in regard to it to formulate an answer. My inference from observation is that they are not present through retrograde metamorphoses, but the result of migration.

Subject passed.

DISCUSSION ON DR. WATER'S PAPER ON REMOVABLE BRIDGE-WORK.

Dr. W. D. Dwinelle, New York City-This is a new field for dentists. There are objections to the old system of bridge-work. Cleanliness is often interfered with very materially. If the piece of work gives way, or breaks in any particular, or a porcelain crown breaks off, it is not possible to repair it permanently unless you destroy the whole device and commence de novo: but by the system of removable bridges we are able to take it out at leisure, correct and renew it, and put it back to its place. Furthermore, in the matter of cleanliness, this new system of Dr. Water's removes the objection very materially. I am pleased with his system of telescoping, so to speak, his bridge-work on to other teeth, preparing the crowns by cementing a gold cap upon the natural crown, and when taking an impression of that and fitting a cap which is made to slip upon the cap-crown already in the mouth. Then the splitpost, in conjunction with it, gives it firmness, which is very desirable. We are not obliged to resort to the old system of cementing bridge-caps on permanently, which is objectionable.

Dr. Parr has invented a system of removable bridge-work of a very ingenious and practical character, doing away with most of the objections to work of this kind.

I regret that he is not present to exhibit to us his new system. I believe, however, he has held a clinic during our session illustrating his method. He regards his invention as a fixture, permanent when in position, and easily removed and replaced at the will of the patient.

I am very much interested in bridge-work. I claim that in a treatise published in 1855 in the old "American Journal of Dental Science." I there published to the world, the system of cap-crowns and so-called bridge-work, which was my invention.

Dr. A. G. Bennett, of Philadelphia—I am somewhat known as an advocate of bridge-work, but have no desire to be known as such except in so far as this mode of substitution conforms to dental science and is constructed on correct mechanical principles. I think the progress thus far made is as rapid and satisfactory as could be expected.

The idea of cleanliness has been very properly more emphasized than any other. With the removable bridge we get rid of several objections that were formerly inherent in certain kinds of cases; cleanliness is secured and repair made easy. With the first method—that of cementing in securely—I cannot say that I have had any trouble that could be charged to the system itself; but in cases of chronic trouble about the roots or low recuperative power, the improved system has several advantages.

With the first method the bridge and the abutment caps were one piece; now they are separate. There are two kinds of removable bridges: the one to be removed by the operator, the other by the patient. If the abutment or anchorage teeth are properly prepared and entirely encased in gold caps, we have done our utmost permanently to protect and preserve the foundation of our work. Of course, leaks and ledges and irritants must be carefully provided against in each case. Bridges designed to be removed by the patient are usually retained by a spring. There seems to me to be a weak point in this method in that the spring may be loosened or unsprung, and then the bridge is open to the same objections that many small partial plates are—it may get into the throat. I have not tried the spring method, but have constructed some on a modification of this principle, and now make all my bridges so that they can be readily removed by softening the gutta-percha which holds them in place.

But I will first speak of a method of my own. About a year ago I had some cases that required that the gold should be kept entirely out of sight. I did this by encasing the inner half of the teeth—molars and bicuspids—with half caps that were anchored in a groove that passed between the cusps and down the proximal surfaces beneath the gum. I used the Bing bridge teeth which showed only a mere line of gold between, and the end which rests on the gum, the denture being anchored with gutta-percha. These teeth are prepared by grinding off the rounding part of the palatal surface, which is afterwards restored with gold solder.

As to bridges resting on the gum, I thought at first that this was not a good plan; but I find, by examining cases set in this way and by a little experience with the method, that, if the porcelain fits accurately and is brought to bear lightly against the gum, there is neither irritation nor uncleanliness. This resting on the gum is one of the chief points in the Brown bridge, which is all porcelain baked around a platinum skeleton.

One of the worst objections to the outward sloping palatal or lingual surfaces of the gold cusp teeth is that they are not exposed to attrition, and cannot be kept polished. Under such conditions, a solder surface will tarnish sooner or later, and then food debris becomes adherent, and the parts are uncleanly. The Bing teeth, as I use them, must, of course, have a solder palatal or lingual surface; but since this is perpendicular, it can be readily reached by the tongue and brush.

In other cases, as already stated, I have used a modification of Dr. Parr's system. This system consists essentially of a socket in the abutment-cap and a tongue containing a spring on the bridge proper. The socket on the tooth-cap and the pin on the bridge are roughly illustrated by the pin and aperture on a molding flask. The tongues are pressed into their respective sockets, and the denture is then cemented into position, which sets the caps parallel, allowing the part that spans the space to be readily removed. I have modified this method by leaving out the spring and anchoring the bridge with gutta-percha. I make the socket round, and fit the pins a little loosely, to leave a space for a film of gutta-percha, the advantage being that no spaces are left and all moisture excluded-I do not wish to be understood as condemning the spring sys. tem, which can be made very strong and durable; but, for the reasons given above, I prefer the modification which I have mentioned.

I will add that I consider bridge-work to have passed beyond the stage of controversy. It is based on principles as well established as those of any other system of substitution, and a method of inserting crowns without roots does span the chasm which has heretofore existed between crowns and plates. Each one has its proper place, and all are needed to meet the varying conditions. A plate is a foreign body. A bridge is the same, with this difference: that the latter, when properly made, is not half so injurious as the former. Defects have been, and are still being eliminated, and objectors are changing their attitude or subsiding into silence. We are making progress, and have every reason to believe that we have contributed something to dentistry that is of permanent value; and I will give it as my final opinion that bridge-work has come to stay.

Dr. W. H. Dwinelle, New York City—I have a personal interest in this matter, as I introduced the system many years ago; and in order to justify myself in what I have said on this occasion, I beg to refer those present, who have the opportunity of looking into the back volumes of the "Cosmos," to an article by Dr. Stover Howe, on The "Evolutions of the Tooth Cap, Crown and Bridge-work,"

in which he justifies me in all I said this afternoon. He referred to my original article published in the old "American Journal of Dental Science" in 1855.

I shall esteem it a personal favor if you will refer to this article by Dr. Howe, I think you will all justify me in what I have said. I did not know Dr. Howe at the time, so there could have been no collusion in reference to the matter. It was published in the "Cosmos," June, 1886; so it is not far back.

Dr. W. A. Atkinson, New York City—I am delighted with the exhibit before this body. The roots of teeth are inserted so that their crowns may best receive the occlusion of the opposing teeth. The pericementum is a nice, little cushion to break the immediate force of the occluding energy in mastication, especially in biting off hard substances.

If on over shock this pericementum, under the law of nutrition, its action will melt the lime salt, so that without any inflammation that is recognizable, that tooth will become so loose that you may think you can pull it out with the fingers, but you will not be able to do so, as the softened tissues will hold it.

Takes these two teeth (pointing to the specimens), the lime salts are simply melted in situ, and when the quietness that is necessary for the consolidation was secured they became firm in condition. Place the tooth in the position it is desired to have it, and give it steadiness enough to allow hardening of the lime salts of the osseous structure of the matrix, and you will have that in a healthy condition, and be able to bear all the use required of it.

I have seen cases from the Sheffield house of the International Tooth Crown Co., with bridges attached to and carried over loose teeth, and roots which were very unsatisfactory to the patient, discharging pus for months, which under proper treatment became healthy, firm, and useful, some without resetting, and others involving resetting of the pieces, and still others wasted beyond recovery.

Subject passed. To be continued.

EXHIBITS AND CLINICS AT ANNIVERSARY MEETING OF THE ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The S. S. White Dental Mfg. Co. in their exhibit made a specialty of electricity as applied to dentistry, the electric current supplied from street wires or otherwise. An Electric Dental Engine, and a device to stop motor instantly at will; Rotary Fan; To and fro Fan; Electric Plugger; Hot Air Syringe; small electric lamps of from 16 to $\frac{1}{2}$ candle power for use in the mouth; Laryngoscope, Cautery, etc., were shown. They also exhibited a slip joint and duplex attachment to engine; Bonwill's mechanical mallet; also a new line of dental instruments.

Mr. Gideon Sibley exhibited his felt gold, which is claimed to meet a long "felt" want in the profession. Also a needle foil carrier for same, together with a general line of dental supplies.

R. S. WILLIAMS, of New York, displayed a fine assortment of gold foils, gold plate, cylinders, pellets, and blocks, including his specialty "Crystalloid Plastic Gold," which has many friends in the profession. It was freely tested during the exhibit, and seemed to be all that was claimed for it.

C. Ash & Son, of New York and England, exhibited a full line of their celebrated teeth, as well as general dental supplies.

THE WILMINGTON DENTAL MANUFACTURING COMPANY made a display of "Wilmington Teeth," including Dr. Genese's Pinless Teeth and specialties, Wardwell's treadles, a new cabinet, and the new Register Engine, Hand Piece and Mallet, a description of which will be found in Domestic Correspondence Department.

THE KELLER MEDICINE Co., of Ft. Wayne, Indiana, showed a large assortment of non-secret medicines, together with new dental chairs, motor, gas apparatus and dental materials.

SEABURY & JOHNSON, of New York, displayed their Hydronaphthol Specialties, Antiseptic Cotton, Napkins, etc.

Henry C. Blair's Sons, Philadelphia, exhibited a full line of Tooth Powders and Washes.

PARKE, DAVIS & Co., of Detroit, were represented in their various preparations of Cocaine, and Antiseptic Tablets, as well as a preparation or Powdered Bone, which they recommend as a true nerve and bone food.

WALTHAM EMERY WHEEL Co. exhibited a large line of Dental Wheels and points for dry grinding.

DAVIDSON RUBBER Co., of Boston, displayed their specialty of "Velvet Rubber Dams," as well as all forms of Dental Dams.

H. K. Mulford & Co. showed an extensive list of Dentifrices, Powders, Antiseptic Tablets, Capsicum Pads, including their Silica Fluoride of Sodium preparation for a dentifrice.

EDWARD ROWAN, of New York, exhibited his preparation of gold, and specialties in filling materials.

H. D. Justi, of Philadelphia, displayed teeth and dental supplies.

Dr. Seabury, of Providence, R. I., made an exhibit of the Seabury Vulcanizer.

W. M. Speakman showed, besides several novelties, a general supply of dental goods and teeth. The Parson's electric hot air apparatus attracted considerable attention.

. W. P. GREEN exhibited Engine Burrs.

Dr. W. G. A. Bonwill demonstrated the use of hard rubber corundum disks for sharpening burrs.

Dr. J. W. Ivory, Philadelphia, displayed his Improved Rubber Dam Clamp, including his napkin clamp, which seems to embrace many desirable qualities.

The International Dental Journal distributed sample copies and took subscriptions.

Dr. C. C. Carroll, of New York, exhibited his automatic gas furnace, flask, and pneumatic crucible for casting aluminum dentures, bridges, and crowns.

CLINICS.

Dr. H. C. REGISTER, of Philadelphia, gave a clinic, contouring a right superior central incisor and building down a left superior central incisor with cylinders (finishing with foil) with the Register Mechanical Mallet and compensating engine.

Dr. T. S. Waters, of Baltimore, exhibited three pieces of removable bridge work in the mouth. The first was a gold crown sliding over a cap attached permanently to the teeth or natural crown. This cap has on one side a longitudinal groove. The gold crown has soldered on the inside a spring eatch, which works in the groove on the cap, and holds the crown permanently in its place. The second device was that of the "Box-Cap and Split-Post"—a box-cap being fitted permanently to the root, and the split-post being soldered to the plate having the teeth. The doctor also showed a third device—that of soldering to the side of the gold crown covering the natural teeth a split pin or post, which is inserted into the teeth attached to the denture.

- Dr. Waters, in addition, exhibited an entire denture supported by six anterior teeth; as well as a full denture supported by two cuspids, a bicuspid and a molar. All these pieces are under perfect control of the patient, who can take them out at will, and can thus be kept in a perfect sanitary or hygienic condition.
- Dr. A. G. Bennett, of Philadelphia, exhibited a "Rapid Excavator," for large cavities; also a plugger—two points in one shank, for the hand or automatic mallet.
- Dr. H. A. Parr, of New York City, showed a removable bridge carrying a sixth year molar and two bicuspids. The attachment was made by a spring fitting into a slot made in the cap on the twelfth year molar. The plate rested on the gum, fitted very nicely, and seemed all that could be desired. Dr. Parr also exhibited his universal separator.
- Prof. R. B. Winder, of Baltimore, exhibited three removable bridges—two lower and one upper attached to adjoining teeth with set screws. The doctor also showed an adjustable rubber dam clamp, which is certainly a handy, little article.
- Dr. J. A. Woodward exhibited a novel and excellent appliance in the shape of an illuminating apparatus for dark days, by which the most intricate filling can be clearly seen, and with a mouth mirror the light can be reflected to see any dental approximate surface. It consists of a Mackenzie light concentrator No. 2 for illuminating gas, with reflecting mirror, and is mounted on a heavy, upright rod attached to an arm which swings from the base of the Wilkerson or High-Low Base chair. When adjusted for an operation it will follow the movements of the chair.
- Dr. Woodward stated he decidedly preferred this light to poor natural light; but that the electric light shown by the S. S. White Dental Mfg. Co. was more convenient, as it could be placed further away from the work and yet give equal intensity. It also weighs less, is free from heat, and does not require the flexible rubber tubing.
- Dr. J. Gardner Morey, of New York, gave practical illustrations of the methods of using his nerve and crown drills; and also exhibited his separator, with which he obtained a space $\frac{3}{64}$ of an inch in $2\frac{1}{2}$ minutes, with little or no pain or inconvenience.
- Drs. W. S. How and R. Walter Starr gave a clince on Dental Inlays with porcelain.

Editorial.

THE BASIS SUBSTANCE IN CALCIFIED PRODUCTS.

Your especial attention is called to the faithfulness with which the appearances seen in the tissues are dilineated in the plate in this issue. The illustrations were produced by a photographic process from the original photomicrographs made by Dr. Andrews. The reliability of the process is beyond question, and gives something that may be relied upon in that the illustration is the "shadow" outline of the phenomena presented in the original tissue, and not the result of a draughtsman's skill. You are requested to study the plate and draw your own conclusions in regard to the presentations there shown.

The formation of calcoglobulin has been the subject of investigation for many years, and the manner of its development is now very generally understood. In our writings upon the subject, which were published in the American System of Dentistry, we treated of the matter quite fully, dwelling more especially, however, upon the nature of the process than upon the phenomena observed, considering that the latter had been so well presented by former writers as to need no further elucidation. We have gone over the experiments and substantiated the correctness of the observations of Mr. Rainie, and in addition, studied the formation of renal. billiary and vesical calculi, where the menstruum, in many if not in a majority of instances, is composed of mucus or pus. We there pointed out the probable manner in which lime salts were deposited, under the superintendency of the living cells, in the intercellular protoplasm, giving rise to a new product, and indicated that the form of the resulting product was directly under the control of the life force, while the chemical nature of the tissue thus formed was not, in that a similar product could and had been produced in the laboratory without the intervention of the living principle found in nature.

The evidence that Dr. Andrews brings to our notice is of a different character, being an ocular demonstration of the peculiar conditions presented in the special tissues under consideration, and herein lies its value. Let us consider its special features, and in so doing we will state in the beginning, that we have carefully studied the original slides kindly furnished us by Dr. Andrews, and have discovered what seems to us to be the key to the explanation of the special phenomenon shown in the plate.

There can be no question that Dr. Andrews is correct in his conclusion that the globular masses seen on the border land of calcification are of the nature of calcoglobulin first described by Mr. Rainie, and afterwards brought forward by Mr. Tomes and ourselves, in discussing the subject. There is, however, a further lesson to be learned from the evidence.

Three questions arise in regard to the nature of the process herein presented, viz: as to whether the tissue delineated is normal, pathological, or the result of morphological changes that have taken place during the hardening process. If the condition were artificial, as some seem inclined to consider it, then we should expect to find the forming surface of the dentine throughout the entire specimen, presenting the same globular appearance, which is not the case, as was demonstrated by a careful study of the original specimens. In other portions of the sections the forming dentine showed the even, smooth gradation from organic to calcified tissue. This was so throughout all the sections examined. The particular condition, then, is local in character, and we must therefore dismiss the idea of its being the result of post-mortem change.

As opposed to the theory presented, that it is the normal production of the basis substance, we have to array our own experience and say that in our studies, extending over several years' constant work in embryology, that we have never met so marked a case of globular formation upon the border-land of calcification in any portion of the body as is here delineated. While we have seen a more or less constant tendency upon the part of forming calcified tissues to produce the small bodies denominated calcospherites, and which have also been observed by Messrs. Robin and Magitot in the pulps of developing human teeth, and by Henle in those of the herbivera, yet it has never been our fortune to observe the globular masses shown in the slides from which the plate was made.

This, however, may be said to be only negative testimony, nevertheless in the case in hand such evidence is of the greatest importance in establishing our view of the case, viz: that it is pathological in character for, a process to be considered normal must be constant in its presentation. The fact that at least one observer has failed to find it so is more or less conclusive evidence that it is not what might be termed a normal or physiological appearance. When we take into consideration that pathological processes are only perverted physiological processes, which may be only one step removed from the normal, it does not necessarily

mean any great divergance from the normal process of development. Then again the same argument that was used against the the idea of its artificial nature can be here used, seeing that the other portions of the tissues in the same section do not present a similar character. Our interpretation of the phenomena presented in the plate is that through some cause, the nature of which we are unable to explain—there has been a local disturbance in the physiological process and these large (microscopically) globular bodies have resulted.

Mr. Tomes has described what we take to be similar appearances, and if we understand him correctly, holds the same view with us, when he says "that globular, spherical forms are constantly to be seen at the edge of the thin cap of forming dentine and may be traced in and around the interglobular spaces." In another place he says, that "although these spaces are very common, they are perhaps not to be regarded as perfectly normal, but are rather indications of an arrested development at that spot."

The above interpretation of the condition does not in any way detract from the value of the illustration but on the other hand, to our mind, enhances it in that it offers an explanation for the formation of "Interglobular spaces."

SIDE TRACKS.

During all my professional life I have, I trust, been traveling in one direction, and that is towards perfection. I have tried many roads that were inviting, some of which I soon found were leading me away from the goal at which I was aiming, and were at once abandoned. Especially during my early years did I attempt numerous short cuts and by-paths, that were guaranteed by enthusiastic confreres to land me at the desired haven in an almost incredibly short period of time; but invariably I found myself floundering in a swamp, if not warned in time by seeing my adviser, who had preceded me, stuck fast in the quagmire to which all short cuts inevitably lead. Experience has brought something of wisdom, and now when a half-balanced visionary urges upon me some gim-crack invention which entirely simplifies all dental operations, so that even a tyro is enabled to produce results to which long experience has not yet attained, I listen complacently, encourage his investigations, but stick to the old, well-worn road, until I see him come limping back, covered with the mud and bedraggled with the slime of the slough in which I was morally certain he would land.

I cannot remember half these by-paths into which I have been enticed, and into which I fear I have at times helped to inveigle others. One of the first was called plastic gold, and a beautifully shaded pathway it was until I had passed one or two milestones. Then the scene changed, and I was glad to get out of that gulf of despondency. I still occasionally hear the halloo of some one from that direction, who claims to have found solid ground in the morass; but I am satisfied with my experience, and feel certain that the neighborhood is treacherous footing.

Shredded or felted tin for awhile took me off my feet, but that I escaped from. Amalgam paths have opened on every side, and at the entrance of every one stood some loud-mouthed touter, vaunting the advantages, directness and abbreviations of his short line, and vowing that his way was pleasantness and all his paths were peace; but the unavoidable swamp stared me in the face when I took a good look ahead.

Then another side track opened, and that was called the oxy chloride-of-zinc path. I traveled this a good long distance, and got into the worst mess in which I have ever been entangled. How beautifully did a touter for this path display all its wonderful charms. He was an old and highly respected member of my profession, and he pictured the seductive road as the one specially opened for him, and incidentially for others, by angels with wing-feathers of extraordinary length and brilliancy, and they illuminated every foot of the way, causing it to shine with scintillations of their own glory. No more worry concerning those great rocks, exposed and even putrifying pulps. Saturate them with carbolic acid, place them in this new road and tenderly kiss them good-by; though wounded, sore and bleeding, the angels would look after the suffering ones and all would be sweetness and light. Well, these ministering spirits proved to be swamp angels, and they left me as usual, wallowing in the mire. I found that the great rocks must be surmounted by patient and toilsome effort. There was no royal road around them, and so, when long afterward another path called immediate root filling offered itself, and was persistently urged as the only short line to success, I remembered how I was bedraggled in a path of which this seemed almost the counterpart, and stuck to the highway.

Amputation of pulp was a little bridle path which opened out of the former one, and I think led to even a worse morass, but for a wonder, I did not get into that. Implantation is even now an inviting path, and I have tried the ground sufficiently to convince

me that there is little of firm footing there. I might go on and enumerate a hundred other leafy by-paths which I have trod, or been urged to essay. Some of these seem alluring indeed, but someway I have almost invariably discovered that the one who was most importunate in demanding that I should step aside, usually had some proprietary interest in the line, or had at some vantage point erected his little toll-gate and demanded a contribution, either by way of license to travel, or through the sale of some help to locomotion which, he informed me, was essential to proper getting-on. I am getting to be an old bird, and rather a shy bird, and now when some voluble advocate of any short road to perfection, at society meetings or elsewhere, assails my ears with his auctioneer eloquence, I mentally ask him—"Let me see: where is your toll-gate. Is it at the very entrance of your patent path, or am I to encounter it a little further on?"

I am far from the assertion that there is nothing good in any of these little side-roads, but I do believe they are never fit for general travel. I do not regret that I tried any one of them. I only lament that I went so far at times as to lose sight of the main thoroughfare. Had I but strayed into them incidentally and gathered a few of the flowers that blossomed, carefully picking my way instead of blindly rushing along without taking due heed to my footsteps, I should not have brought up in the mire at their ending and been obliged painfully to retrace my footsteps until I laboriously found the old way again.

All my path of life in the past is indicated by land-marks, and each year is a milestone by which I can judge of the progress that I have made. I am happy in the belief that no two of them stand exactly together. The annual mile is of greatly varying length, and sometimes on looking back I can see that certain successive stones are a goodly distance apart. Others are nearer each other, but I do not believe that any one is not a fair distance in advance of its immediate predecessor. The early milestones are closest neighbors, because I did not then set myself down to the steady, plodding gait which alone tells in the race of life. But upon the whole I have made fair progress-not through swift running, but because I have honestly tried always to keep moving. I propose to continue this while I live, and if I could practice dentistry to the age of say two hundred and fifty, I think I might become reasonably skilful. I have no idea that I could even then become perfect, or accomplish that which so many of my confreres now claim to do-save one hundred, or even ninety per cent. of bad cases, exposed pulps, etc., but I should, I know, be far in advance of what I am to-day, for I believe that the annual milestones would grow further and further apart as the line lengthened and I learned more assiduously to shun the short-cuts and patent cross-lot paths to perfection.

Golden results are produced by golden means, and there is no excellence without great labor. No man who has attained to eminence in any walk in life ever got there through a side-cut. He went painfully and laboriously away around by the only sure path—the great highway of legitimate practice. Varney and Webb had no patent method of operating, but depended upon painstaking thoroughness, and I have never heard of any feather-minded seeker after by-paths and short lines to success who obtained results like theirs. The hardest lesson that young practitioners have to learn is to surmount obstacles instead of trying to go around them.

W. C. B.

CARIES IN HORSES AND DOGS' TEETH.

In a recent letter received from Dr. Miller, Berlin, he says that he has been studying decay in the teeth of animals, and that he has succeeded in making some beautiful preparations which show identically the same appearance found in caries of human teeth. The micro-organisms principally concerned are micrococci. Dr. Miller is a most indefatigable worker and is always reaching out into new fields. His book on Dental Pathology is nearly ready for the press. We look forward to its perusal with pleasure.

DENTAL EXHIBITS.

The Exhibition of Novelties in our dental meetings is one of the most interesting features of the session. The relation between practitioner and dealer is a mutually dependent one, the former depending upon the latter for his supplies, and the dealer upon the consumer for the disposal of his goods. The exhibit therefore forms a valuable annex to our dental conventions, enabling the dentist to see, and the dealer to bring at once before a large number of the profession the latest novelties in use. Each year adds its proportion to the already long list of useful appliances, and the late exhibits in their entirety show that the mechanical and labor-saving workers of the profession are not far behind the great advance being made in the science itself.

Foreign Correspondence.

To the EDITOR:

In a confidential letter shown me by my friend, Dr. I. B. Davenport, Dr. Thackston, although speaking in the kindest manner about the French Dental Congress of 1889, expressed the fear that this congress might injure the Dental Section of the General International Medical Congress, whose next session is to be held in Berlin in 1890.

Dr. Thackston fears that the organizers of this French congress would be mostly all schismatics, who abstain from general international reunions, and who would not hesitate to raise up altar against altar. I can boldly affirm that this idea has never entered the mind of any one among us in France. The Paris Exposition in 1889 will certainly attract a large number of our colleagues from all lands. Why should we not take advantage of the occasion to discuss subjects interesting to all of us, questions of practice, professional organization, etc.? While acting upon this idea we had no thought of hostility towards the International Medical Congress of 1890.

The ophthalmologists have held their seventh international congress, the last session taking place at Heidelberg in 1888, if I am not mistaken. The principal organizers of this congress regularly follow the sessions of the International Congress, and it never occurs to them that a reunion of specialists can interfere in any way with a general reunion. There will also be held in Paris in 1889 a Hygienic Congress. Those who take part in it certainly have no thought prejudicial to the hygienic section of the general congress. Why then should intentions be attributed to dentists which no one would attribute to oculists or hygienists? It seems to me that an international dental congress can be held with perfect propriety without in the least interfering with the general international medical congress.

Very respectfully yours,

GEORGE P. E. KUHN.

3 Rue Scribe, Paris, Jan., 1889.

To the EDITOR:

Implantation is still all the rage here, and all kinds of experiments are being tried. Wishing to know if the periosteum really was necessary on the roots of teeth, and really was a factor in success, I scraped and polished the roots of two lateral incisors for implantation and held them firmly for two weeks each; but at the end of

that time they slipped out of their own accord on the removal of the retaining plate; in one case there was some necrosis of the socket, but the other socket was perfectly healthy and the gum normal. Patients each 40 years of age.

I am very much interested in the trials of the implantation of porcelain teeth with porcelain roots, which were mentioned in some recent society meetings. Can you give any information as to the results?

The great difficulty here is to get suitable teeth, and I was very much surprised to learn from a Swiss-American colleague, Dr. Wetzel, of Basel, who allows me to use his name, that he gets the best teeth and has success in implanting them from the subjects in the dissecting-room. This was news to me, but he says that it has been the practice with several whom he knows. Teeth used to be gathered on European battle fields, and sold in sets by supply dealers for artificial dentures in old times before porcelain teeth were made, so there is nothing new under the sun except the Low Patents,

These patents do not trouble us in Switzerland, however; for no patent laws have existed in this country of ingenious people. and they have had free use of the inventions of all nations, and the new laws of last year only allow patents for inventions made after the passage of the patent laws. With the use of the world's inventions it was found that the Swiss, though naturally most clever and inventive and the first successful makers of watches, were falling behind those countries which had patent laws, and only regained their waning prestige in watch-making after seeing and buying the improved machinery exhibited at the Philadelphia exposition. The authorities find that inventive genius needs stimulation and protection. The professional (?) movement in America to discourage dental patents seem most short-sighted considering the fact that the grand achievements of American dentistry have been gained with the splendid and unequalled instruments patented by American practitioners. There are glaring abuses and serious faults in the system which need correction and reform, but if the profession expect the march of improvement and invention to keep pace with their daily increasing and labor-saving machinery, they will have to grant the necessary reward to stimulate the tired practitioner, to whom an idea of a new investment has occurred during his day's labor, to give up his hours of needed recreation and rob himself of his well-earned rest, to make and perfect and put on the market that which will assist his fellows and be a boon to mankind.

Renewing my thanks for the Topical Index I am, Yours fraternally,

Basel, Feburary 4, 1889.

L. C. BRYAN.

TO THE EDITOR:

Among the various reforms that have taken place here, during the last ten years, one of the most important is now being introduced, viz.: establishing a dental school at the regular medical school. Guy's Hospital Medical College, one of the largest and oldest in the kingdom, has undertaken the experiment for many years. Guy's Hospital has had a dental department. F. Newland Pedley, F.R.C.S., has during his connection with this department still further developed its utility. Lately he has contributed some very valuable and forcible articles upon "Dental Reform in General Hospitals," and upon Dental Scools at Medical Colleges. At a recent meeting of the Governor's of Guy's Hospital, it was decided to erect suitable buildings to carry out this scheme. Opinion is divided upon this innovation, feeling so proud and grateful for what the special schools and hospitals have done, we shall watch with interest this new school, the success that has been attained in America, of the Dental Departments of Universities may throw some light upon the future of "Medico-Dental Schools.

Brighton, Eng. Walter Harrison.

To the Editor.—The British Dental Association will meet in August, at Brighton ("the Queen of the watering places"), this year. President Samuel Lee Rymer, J.P.L.D.S. (Croyden) and the local Secretary, J. H. Redman, D.D.S. Dr. W. G. A. Bonwill has accepted an invitation to attend the meeting of the British Dental Association at Brighton the coming summer, and clinic on his special methods of practice. He will also attend the Dental meetings in London, Berlin, and the International Congress, in Paris.

XX.

CHANGE IN NAME.

The Welch Dental Company has been merged into the Wilmington Dental Manufacturing Company with largely increased capital. No change will be made in the membership of the new firm; they, virtually, being the same, although heretofore doing business under two separate names.

Domestic Correspondence.

TO THE EDITOR:

The "Hotel Gerlack" in New York City is a new and massive building with the most modern and elaborate fittings and appointments.

On the evening of March 11th, in the magnificent dining-room of this fine hotel, were arranged long rows of tables furnished and decorated in a sumptuous and artistic manner. It was the occasion of a complimentary dinner given by the dentists of New York, Brooklyn and New Jersey to their esteemed friend, Dr. Wm. H. Atkinson. In every chair at the tables was seated a happy occupant, each displaying a floral decoration.

During the early part of the evening a number of ladies, guests of the hotel, appeared at the doors of the banquet hall to witness the large gathering of joyous gentlemen who had assembled at the "gay and festive" board. Dr. C. E. Francis presided on the occasion. At his right appeared the honored guest of the evening, and at his left sat the much respected Dr. Wm. H. Dwinelle, to whom was tendered a similar banquet a year ago, on the completion of his fiftieth year of dental practice.

After all were seated, Rev. Dr. Bachus, of New York, at the request of the President, asked Divine blessing. Next came the army of waiters, well trained, polite and mannerly, and the good things were provided for the "new comfort" were profusely served.

At the conclusion of the feast the President called to order the mirthful assembly, and in a brief speech paid a worthy tribute to the honored guest, "whose name," said he, "is as familiar as a household word to every intelligent dentist in the enlightened portion of the world, and whose labors for the benefit of his fellow practitioners and the whole specialty has not been equaled by that of any other individual."

The following "toasts" presented by the committee were then read by the President:

"Dr. Atkinson, our guest."—"His eminent attainments have won our admiration. His devotion to the welfare of the profession he loves and adorns, and his unceasing efforts for its increased efficiency, not only in this city of his residence, but elsewhere as well, wil. make his name to be ever gratefully remembered; and the recollection of his acquaintance and friendship a perennial cause of gladness to every New York dentist who has been associated with him during these years of active life."

Dr. Wm. Dwinelle being called upon to respond to this sentiment, paid many just compliments to Dr. Atkinson, and referred to his life of action, work, and useful labors among his professional brethren. The President then read his second toast. "Dr. Atkinson, our guest."—"As a man and a citizen, we respect him. As a professional brother, we highly esteem him. As a tireless leader in scientific research, a fearless propounder of the truth discovered, a generous giver of the fruits of his patient toil in this field, we honor him. As a warm friend and willing helper of everyone who is honestly struggling along the same road toward light and improvement, we love him." The President called upon Dr. C. A. Marvin, of Brooklyn, to respond, and the doctor proved equal to the occasion. His graceful speech and glowing peroration called forth showers of applause.

The third toast was then presented:

"Dr. Atkinson, our friend."—"Ever ready to lend a helping hand to the earnest but weary student; to hold out a light for stumbling feet; to impart his wisdom to them that lack; to add inspiration by his stirring words to the discouraged; to stimulate by his unconquerable ardor the search for truth when it is in danger of flagging, and the effort for professional progress when it halts; his name will be remembered, honored and loved by his professional brethren in every city and in every land whither they may direct their steps."

Dr. C. S. Stockton, of New Jersey, spoke in response to this toast. He praised the generous deeds of Dr. Atkinson, whom he pictured as a true and valuable friend to the members of his profession.

Rev. Dr. Backus was then introduced, who made a brief congratulatory speech; after which the President requested all present to rise and unite with him in drinking to the health of their "citizen, guest and friend," and wishing him many years of happiness and prosperity. This was done with a hearty good will.

The President then introduced the guest of the evening, whom he requested to speak in his own defence.

Dr. Atkinson's speech was followed by a few appropriate remarks from Dr. Heitzman, and the happy gathering dispersed.

Much credit is due to Drs. Northrop, Lord and Hill, of the committee, for the excellent arrangements for the dinner.

To the Editor:—A dinner was given by members of this Society to their out-of-town guests on Tuesday afternoon, March 19th, at Hotel Brunswick, Fifth Avenue, New York. Among those present were Dr. H. C. Merriam, of Salem, Mass.; Drs. Niles, Hopkins, and Potter, of Boston; Dr. Geary, of Lowell; Dr. L. S. Straw, of Newburgh; Dr. C. N. Peirce, and W. X. Sudduth, of Philadelphia; Dr. Geo. Parmly, of Hartford; Dr. Geo. Mosley, of Buffalo; Dr. J. Palmer, of New Brunswick; Dr. S. G. Palmer, of Syracuse; and Dr. C. S. Wardell, of Stamford, Ct. Many prominent dentists of New York and Brooklyn were also at the table. Social topics were discussed in a pleasant conversational way. After dinner was over the entire party wended their way to the parlors of the Academy of Medicine to attend the regular monthly meeting of the Odontological Society, a brief report of which appeared in the New York Tribune, as follows:

"The Odontological Society of New York met last night at the Academy of Medicine, No. 12 West Thirty-first Street, to listen to a paper by Dr. H. C. Meriram, of the Harvard Dental School, on 'Professional Atmosphere and Morals.' He would class dentistry as a 'specialty in medicine,' and maintained that the only reason why, with most of its practitioners, it had not been raised above the level of a trade, was that dentists had encouraged and supported methods which tended to make their profession decidedly illiberal. The chief difficulty, he said, was that some members of the profession had invented devices, appliances, materials, instruments, etc., which they had patented and sold to a combination which oppressed the whole fraternity by charging exhorbitant prices and imimposing annoying conditions for the use of the articles so controlled."

"He pointed out the fact that no such condition existed in the liberal professions, the lawyer, minister and physician having free access to all that his brothers achieved, and hoped the day would come when the same could be said of dentistry. A discussion followed the reading of the paper." X.

TO THE EDITOR:

The annual meeting of the Louisiana State Dental Society was held in New Orleans, March 5th and 6th, 1889, the President, Dr. C. B. Johnson (Monroe), in the chair.

The Executive Committee had quite recently decided to postpone the meeting to a later date, but, owing to some misunder standing, notice of the intended change was not issued in time to

reach a number of members in distant parts of the state, who arrived in the city, expecting the usual meeting on the date appointed.

A rather informal meeting was therefore held, the President's annual address being the only paper read.

A resolution was adopted inviting the Mississippi State Dental Society to hold a joint meeting with the Louisiana State Society.

Dr. Bauer announced the reception of a letter from the Secretary of the International Dental Congress, asking the appointment of a delegate to attend the meeting of that body in Paris, September 1st, 1889.

The election of officers was held, with the following result: President, Dr. Jno. W. Adams; 1st Vice-Pres., Dr. Massingill; 2d Vice-Pres., Dr. Comeygs; Rec. Sec., Dr. J. G. McCodloch; Cor. Sec., Dr. C. E. Kells, Sr.; Treas., Dr. P. J. Friederichs. Board of Dental Examiners: Dr. C. B. Johnson, G. J. Friederichs, J. Bauer, Chas. Eckardt, M. Viet. Executive Committee: Drs. A. G. Friedrichs; I. J. Savrazin, Chas. Eckardt, E. Telle, J. G. McCulloch, A. J. Friedrichs.

The Society then adjourned to Wednesday, February 19th, 1889.

Mrs. J. M. W.

To The Editor:—In answer to your letter of inquiry regarding my engine and mallet I claim the following novel features: The power can be applied either by foot or motor, when by the latter it is converted into a compensating suspension engine. The radius of the arm can be positively held at any desirable point in either engine. The arm of the foot engine is connected at the shoulder at top of pedestal, by an universal joint, which is capable of being thrown, and used with the same results on either side of the pedestal, making it right and left handed with. out drawing the cord across the pedestal or standard. The idlers throughout are mounted on a central pivot, which permits the cord running over them to draw automatically to the greatest tension, and thereby equalizing the strain in any and every position that the arms are placed, allowing it to run as freely with the arms folded to their extreme point, as when lengthened to their full extent. In other words, by a crucial test which was made upon the engine by a wire passing around the driving wheel, and the arm held in a perfectly vertical position, and the wire following its course, and drawn tightly, allowed the arms to be folded to their minimum length, without any apparent tension upon the wire. This has never been accomplished in any other engine. The idlers of the

elbow and wrist joint carry out the same device as those of the shoulder, which gives the engine great power. When not in use as slip joint at the shoulder, allow the arm to be dropped at the side of the standard—out of the way.

The Mechanical Mallet contains several novel features, among which is an impact anti-friction roller on the periphery of a wheel that is hinged above, and comes in contact with the head of the spindle. It is adjustable, to be driven by a cord, or by the axle caught in a hand-piece, making the mallet adaptable to all kinds of engines in use. As the wheel is rotated, the impact anti-friction roller coming in contact with the head of the spindle, rolls over it, producing pressure akin to the action of the hand and wrist, being a mechanical imitation of the push blow, as an instrument would be used in the hand. The struck end of the spindle may be made either solid from end to end, or an additional anti-friction roller may be placed in the contact end, making two anti-friction rollers, relieving each other; or a rubber plunger may be used to receive the blow and transmit it to the spindle. These devices lesson the noise, and the push movement of the instrument, over the hammer blow, either of spring or cam movement, is very much more tolerant to the patient, and effective in its working properties. The regulating device for increasing and diminishing the blow is very simple and effective, being arranged in either of two ways. First, by a swivel joint catching a capstan threaded below it which cannot revolve, and a series of notches in a circle on the outer surface of the swivel which receive a spring, and are capable of being turned to the right or left, as it is desirable to increase or decrease the stroke. The second device differs from this only in that the swivel is unbroken, working directly upon a screw movement. Below the swivel movement is a second swivel which allows the instrument with point in place to be revolved in the hand. It is finished in vulcanized hard rubber, which makes a very pleasant contact with the fingers. The receptacle for holding the plugging instruments is made in two forms, one to receive the Snow and Lewis bit points, and the other to receive the electrical plugger points. The entire engine and mallet is simple throughout in its construction, capable of doing effective work, with less liability of getting out of order than any other engine or mechanical mallet of which we know .- H. C. Register.

To the Editor:

Ten Dont's for your readers :-

1. Don't in any way annoy your patient if you can possibly avoid it. By studying his comfort while he is with you, you will get dollars for it later on.

- 2. Don't pick around a cavity, or make any unnecessary scratching; it is very irritating, and often more hard to bear than a good clean cut that tells.
- 3. Don't use thick rubber dam. It acts like rubber wedges, and makes it necessary to crowd the gum back further in order to get beyond the cervical border of the cavity, often causing great pain.
- 4. Don't use large ligatures for tying on the rubber. It crowds the gum instead of slipping under its free margin. Common white sewing silk, "C," well waxed, I use in nearly every case.

 D. M. C.

To the EDITOR:

The use of mer. bichlor is now so common that any means that can be employed to disguise its very unpleasant taste should be hailed with satisfaction. With some patients the taste is most disagreeable and persistent.

For some time I have been using rose-water as a dilutent, and find it works well. I keep a one per cent. bichlor. solution ready prepared, and mix it with the rose-water when wanted—generally in the proportion of one part of the former to nine of the latter. Patients notice the change in taste of the "bug poison," and speak of it very pleasantly.

GEO. S. ALLAN.

To the EDITOR:

Miss Emma Prewitt, honorary member and "adopted daughter" of the Southern Dental Association—daughter of the lamented Dr. J. H. Prewitt, Madisonville, Ky.—is probably the youngest authoress in the United States. When but a mere child she gave evidence of unusual descriptive powers, which were first displayed in contributions to the local daily papers, and also in several magazine articles published before she was thirteen years old.

Though but sixteen years old at present, Lippincott & Co. have published the novel, entitled Karline Hoy, to which many of the dentists present at the meeting last summer at Louisville, subscribed.

Her future is rich in promise, both in literature and music, and its unfolding will be watched with interest by every member of that profession which calls her "daughter" in honor of the father who so suddenly passed away in the prime of manhood, but little more than a year ago.

We began the perusal of Miss Prewitt's book on account of the authors relation to the profession and finished it with increasing interest on its own accounts.

Dentos.

Current News.

Beware of the Furorè Americana Dentista.

The holders of bridge patents seem to be frightened, as they are resorting to intimidation to help their cause.

Dr. J. N. Crouse has been notified that he is to be made corespondent in a personal suit for damages by the International Tooth Crown Company for active partisanship in pushing the interests of the Dental Protective Association.

Dr. Charles D. Cook, Brooklyn, said at a recent meeting of the New York Odontological Society, "when any one tells me I dare not do a given thing, then I begin to seriously think about doing it." You may put my name down on the list of subscribers to the Dental Protective Association.

The indictment of Dr. Henry A. Parr, charged with an assault upon Jackson W. Alward, was dismissed yesterday in the Court of General Sessions by Judge Gildersleeve. The case has attracted considerable attention among the dentists of the city for a year past. Mr. Alward is the agent of the International Tooth Crown Company, and he charged that Dr. Parr was infringing upon the patents belonging to the company. Dr. Parr set up a counter claim, whereupon Mr. Alward called at Dr. Parr's office one day last April and demanded settlement. The testimony given at a trial some months ago showed that Mr. Alward was very noisy, and refused to leave when ordered to do so, and Dr. Parr struck him and then put him out. Alward then brought a suit for \$5,000 damages, and also had Dr. Parr indicted. In granting the motion for dismissal Judge Gildersleeve said he thought the assault was excusable.—N. Y. Daily Herald.

Dental Meetings.

The Kansas State Dental Association will hold its next annual meeting at Topeka, Kansas, commencing Tuesday, April 30th, 1889, and continuing four days.

C. B. Gunn, Sec.

The Dental Society of the State of New York will hold its next regular annual meeting at Albany, Wednesday and Thursday, May 8th and 9th, 1889.

Members of the profession are cordially invited to be present and participate in the discussion of papers.

G. E. Curtis, Correspondent.

The twenty-first annual meeting of the Dental Society of the State of New York will be held in the common council chambers in the city of Albany, N. Y., on Wednesday, May 8th, 1889.

The Board of Censors will meet on the day next preceding

for the examination of candidates for the degree of M. D. S.

MYRON D. JEWELL, Sec.

The annual meeting of the Iowa State Dental Society will be held at Desmoines commencing May 7, 1889, and gives promise of being an interesting meeting. Dr. W. X. Sudduth, Philadelphia, has promised to be present and give a lantern exhibit and lecture on Pulp lesions.

F. R. Ross,

Cedar Rapids.

Chairman Executive Committee.

The annual meeting of the Mississippi Dental Association will be held at Vicksburg, Miss., commencing on Tuesday, May 21, 1889.

E. E. Spinks,

Meridian, Miss.

Cor. Secretary.

The tenth annual meeting of the Nebraska State Dental Society will be held in Wahoo, on the Third Tuesday in May, 1889, continuing three days.

From the present outlook this promises to be the best meeting in the history of the society. Several men of prominence in the profession from abroad will be with us.

J. J. WILLEY,

Wahoo, Neb.

Cor. Secretary.

The Kansas State Dental Association will hold its next annual meeting at Topeka, Kansas, commencing on Tuesday, April 30, 1889, and continuing four days.

C. B. Gunn,

Leavenworth, Kan.

Secretary.

The American Medical Association will hold its fortieth annual meeting at Newport, R. I., June 25, 26, 27, and 28, 1889. Intending exhibitors should address Dr. Charles A. Brackett, Newport, R. I., chairman sub-committee upon exhibits.

HORATIO R. STORER, M.D., Chairman Committee of Arrangements.

The Illinois State Board of Dental Examiners will meet at the New Council, in Quincy, on Monday, May 13, 1889, at 10 o'clock A. M., at which time candidates for examination must be promptly on hand.

C. R. E. Koch, Secty.

The Seventh District Dental Society of the State of New York, will hold its Twenty-first Annual Convention in the city of Rochester, on the last Tuesday of April, and will continue through Wednesday the 1st of May.

The special Committee are arranging for clinics which will give the convention unusual interest.

The papers to be read will be of great practical value. Members of the profession are cordially invited to be present.

For further information address, The Recording Secretary.

WM. FRANK ARNOLD, D.D.S., 235 East Main Street, Rochester, N. Y.

MINNESOTA STATE DENTAL ASSOCIATION, 1889.

THE Sixth Annual Meeting will be held in Duluth, Wednesday, Thursday and Friday, July 10, 11 and 12.

We have assurance, that reduced rates will be secured at hotels and railroads.

Duluth is most pleasantly situated for a summer meeting, and everything points to a profitable and enjoyable occasion. The committee cordially invite your presence.

The following list of subjects will be discussed, and in order that they may be presented in the most thorough manner, each subject will be placed in the hands of some member to edit and bring before the meeting, and our friends everywhere are solicited to assist us by contributions on any or all of these subjects, of manuscript, clinics, models, slides, drawings or appliances. (Instruments and appliances will be given ample room, and exhibited by themselves.)

Subjects: Implantation, electro-therapeutics, irregularities—causes and corrections; art in its relation to dentistry, comparative anatomy of the teeth, histology and pathology, nitrous oxide—anæsthetics; amalgams—varieties and methods; erosion and abrasion. Contributions upon any other subjects will be gladly received.

Address all communications to

Dr. L. D. Leonard,
Syndicate Block,
Minneapolis, Minn.

THE

International Dental Journal.

Vol. X.

MAY, 1889.

No. 5.

Original Communications.1

SCIENTIFIC ADVANCES.

BY C. C. BARKER, MERIDEN, CONN.

That the microscope is a most efficient aid, and of undoubted utility in the modern attempts to solve the problems of life is certainly true.

You know that in the time of Mr. Lemuel Gulliver, it took a long sea voyage, and the perils of ship-wreck to reach Lilliput.

But now a trip to the world of little things is made, by means of this wonderful instrument, in safe and rapid transit.

In Gulliver's Travels an extended delineation is given of the Lilliputian fauna and flora, but his story is far exceeded by the botanical descriptions given by traveller after traveller concerning the marvellous plant life they have found within the realm of little things, now known as the bacterian world.

How concise is the report of their discoveries!

Let me give you a sample:

"Everywhere in the air of inhabited regions, in the water, and in the soil, are myriads of living organisms, which belong among the simple forms of life, and which are commonly called bacteria.

They are very minute, requiring high powers of the microscope to make them visible.

Some of them are capable of rapid multiplication, so that they may, under favorable circumstances, increase in number a thousand

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

or a million fold even, in a few hours. Some of these organisms appear, to be perfectly harmless having no effect whatsoever, so far as known, upon the health of animals and man.

Others are of positive value in preserving a healthful sanitary condition of the water, soil and air; which they do by breaking down and feeding upon organic compounds which might prove deleterious to health.

On the other hand, it has been definitely proven that a certain number of fatal diseases in man, and several in animals, are alone caused by the entrance into the body of special forms of bacteria.

These bacteria are often called "disease germs" and, like the bacteria which are harmless to man and animals, are very minute.

Thus the organism causing consumption, which is a little rodlike structure, is so minute that if placed end to end it would require from 4,000 to 6,000 of them to reach across the head of an ordinary sized pin."—T. Mitchell Prudden, M. D., (Eighth Annual Report Conn. State Board of Health, 1885).

Others tell us of the size and weight of these organisms.

Think of it! Is it not marvellous that things so exceedingly minute can be made appreciable to our vision?

But the ordinary lenses employed in histological work will not do it. "We must have the recent oil immersion lens,"—so says Dr. Black.

Yes,—and they classify these almost infinitesimal plants.

They tell of four genera.

1st. Sphero-bacteria or globular forms.

2d. Micro-bacteria, or minute rods.

3d. Desmo- or filo-bacteria.

4th. Spiro-bacteria, twisted, or spiral filaments.

This is the classification made by Cohn, another designation of the four genera is:

1st. Micrococci (the word means little grains) are round.

2d. Bacteria, proper. Very short cylinders.

3d. Bacilli are longer.

4th. Spirilla (Lucins Pitkin) twisted rods.

Each genus is also subdivided into varieties and species to many of which are given immense names which, in numerous instances, have a decided hydrocephalic flavor.

To ordinary minds it was a daring attempt thus to identify, classify and group them.

Was there a ever a subject so minute, and yet so broad, or larger?

But this is not all—reporter has followed reporter.

We have been told of their great variety, and most rapid and astonishing increase; how they swarm about us at every identical point of the compass, constantly threatening an invasion and attack upon the sacred citadel of life; indeed, it has come to be quite dogmatically asserted, that every disease to which human flesh is heir is produced by some special bacterium.

For something like ten years, there has been a perfect whirlwind of announcements and assertions in this regard, which has produced an intense mental ferment within the medical profession; until, with many, pathology and bacteriology have become almost synonymous terms. Placed amid such dangerous surroundings it is indeed surprising that humanity has survived until this late date.

We certainly ought to thank our lucky stars.

I cannot help sharing in some measure the skepticism of the Irish bishop, who after reading Gulliver's Voyage to Lilliput, and his travels there, remarked that, "There were some things in it which he could not believe."

But seriously one cannot withold a high respect for the experiments conducted with such careful precision in the laboratory established and presided over by Dr. Robert Koch, in Berlin. My information is obtained through the investigation and report of Dr. Prudden, made at the request of the Conn. State Board of Health; who declared it to be "probably the most complete and perfect which exists."

I cannot attempt a detailed description; suffice it to say that there they claim to identify and isolate single species—making pure cultures of them—studying their life history, and establishing whether "they are, or are not disease-producing—pathogenic."

They further claim that specific micro-organisms are present in "splenic fever, relapsing fever, crysipelas, tuberculosis, cholera, pneumonia, etc., etc., a long list. But these claims are by no means granted on every hand, many eniment medical men are taking strong exceptions to such radical views, and are sternly calling a halt to what they consider rash theorising.

The paper read at Washington before the International Medical Congress, in general session, by Prof. Semmola, of Naples, Italy, was strong and notable in this respect.

Let me give a few extracts :--

"These discoveries are proclaimed on all sides as the true foundation stones of biology, and doctors hasten with eagerness to proclaim that the only end for cure in sickness is inoculation of microbes, or at least, to prepare the organism for surviving the work of the cure by inoculation."

"Observers are too ready to assert that diseases following inoculations are produced by the germ; and I appeal to all lovers of truth to determine, if possible, which diseases are dependent upon inoculation and which are not."

"Who has seen malaria, or diphtheria, or any disease in which it was proven that the disease depended upon the microbe?"

"Rodents, ruminants and some other living organisms show predilection for anthrax; but the carnivora are exempt from many diseases caused by germs."

"Doraine and Koch failed in some attempts to transfer certain germs from one animal to another. What positive demonstration can they furnish of the causation of diseases?"

"Our physical and chemical knowledge of the blood of different animals is so small, that we have no means of knowing what animal furnishes a suituable soil for the growth of these microbes."

"The chemistry of the tissues of an animal is the true basis of judgment of its inoculability or non-inoculability by germs. This, I think, no scientific man will doubt."

"Man lives surrounded by micro-organisms, over which he triumphs, as he does over the material world."

"I have found by analysis the air full of microbes, but as yet we possess no test as to their being injurious or harmless germs. We cannot ascertain correctly the soil in which microbes grow, nor their mode of life, and hence one factor of the problem remains unknown."

"Diseases are produced by inoculation; but are these morbid processes dependent upon the germ or upon the soil in which it is implanted? Demonstration by this method fails; nothing is positively proven; and in the majority of cases common good sense pronounces against the attempted proof. If this method be correct, physiology must be suppressed or reversed. Suppose a man, when sweating, should enter a cave and remain there several hours, contracting a violent acute rheumatism, do you mean to say that I must seek the cause of the disease in a microbe? or did a profound derangement of his physiological conditions occasion the disease?"

Semmola's address was a long one, and bristling with strong points.

It is found in the *Medical News* of September 10, 1887, also in vol. 1, Trans. of the Ninth International Medical Congress.

In the "Anniversary address before the Medical Society of the State of New York," delivered at Albany February 8, 1888, by the President, Alfred L. Loomis, M.D.

Two of the four problems which he discussed and which he declared awaited solution were:—

1st. The relation of microbes to disease processes.

2d. Inoculation as a means of modifying or preventing disease.

His words were intelligent and instructive.

Among them were these:

"When we consider the millions of microbes by which we are constantly surrounded, that the soil beneath us, and the air around around us is laden with them, that they enter the body in the very air we breathe, the food we eat, the water we drink, and yet their influence is baneful only under certain conditions; that it is even possible for men to live in an atmosphere and surroundings which are ladened with the most pernicious form of bacterial life, and yet be perfectly well, the question comes to us, why is this? If the question is ever answered, it will not be until we have a fuller knowledge of the conditions of life, and the inherent properties of even the most carefully studied varieties of bacterial life."

From this language, it is evident that Dr. Loomis considers the theories of the bacterian pathologists as far from demonstrated.

Dr. Ezra M. Hunter, Secretary of the New Jersey State Board of Health, in an article written for the *Medical News* of March 17, 1888, and entitled, "Notes on Progressive Studies in Etiology, and Especially as to Micro-organisms as Sole factors of Disease," remarks that,

"Physicians generalize much more rapidly than do most painstaking specialists in so minute inquiries. Although ten or more years have passed, we may well remember that it was Cohn who says:

"So long as the makers of microscopes do not place at our disposal much higher powers, and as far as possible without immersion, we will find ourselves in the domain of the bacteria in the situation of a traveller who wandered in an unknown country at the hour of tranquility where the light of day no longer suffices to distinguish objects, and when he is conscious that, notwithstanding all his precautions, he is liable to lose his way."

Magnin closes his treatise (1880) thus:

"As to their $r\hat{o}le$ (micro-organisms) in fermentations, in putrefactions, in contagious diseases, and in surgical lesions, notwithstanding the considerable number of labors of which bacteria have been the objects in the different points of view, it is not yet possible to define in a certain manner."

In 1886, E. Klein opened his excellent manual on micro-organisms and disease by cautioning us against taking:

"As proved what has really not passed beyond the stage of possibility."

Prof. DeBarry, in the recent edition of his lectures (October, 1887), states similar views with great precision, and with many cautions against too rapid scientific or clinical deductions.

Says Prof. DeChanmont (1887):

"Those who have followed the developments of the (microbe) question during late years, know what extraordinary studies have been made, and yet we are, as it were, merely hovering about the gate, and have barely entered the field at all."

Again:

"It is shown that pathogenic bacteria (or what are believed to be so), propagate best under unhygienic conditions, light, fresh air, and pure water being inimical."

Dr. Hunter adds here very positively:

"It behooves us to give greater consideration to that class of causes which are generally most decisive of results."

Other prominent authorities are quoted—and last—but by no means least—are Dr. Hunter's own conclusions distinctly summarized.

Allow me to give two or three:

- (f.) "It was only after much had been said of the micro-organisms of disease that we came to realize that the $r\hat{o}le$ played in the economy of nature, or of animal life by micro-organisms is essential for the maintenance of life. Hence, it was almost a surprise when we reached the term, $harmless\ bacteria$; and still more the term, indispensable bacteria."
- (g.) "Microbes have so much to do with what are, after all, chemical processes, that we are not to so far accept biology as to overthrow chemical metabolisms of disease. The biological facts still leave a study of disease from the standpoints of physiological and pathological chemistry. Germane to this is the recent paper of M. Vignal to the Academie des Sciences, published in La France Medicale, No. 99, an article in which not only are the number and variety of microbes in the alimentary canal noted, but the remark-

able or different powers of chemical metabolism which they exercise. The claims of Pasteur for the wonder workings of microbes in the usual processes of digestion and their necessity are in the same line."

(h.) "A new field of inquiry opens as we study the *products* of micro-organisms, and the poisonous products of decomposition. As to either of these, we do not yet know all the relations that are biological or that are chemical. Thus, in anthrax, it is not the bacillus, but, as Hoffa and others have shown, "the poison products accumulating in the blood that causes the fatal issue."

So there is claimed to be a cholera ptomaine. See, also, the researches of Brieger on the tetanus bacilli, and of Rosenbach as to the two alkaloids, tetanin and tetanotoxin, both of which introduced into animals (without the bacillus) produce their specific action. So in the various ptomaines (selmi) and leucomaines we have to deal, perhaps with chemical products, and not with actual animal or vegetable life in situ.

In fact septic poison, or sepsin, results from various chemical processes which in themselves are destructive to every living micro-organism.

It is very plain to be seen that upon this exceedingly minute, and also exceedingly large subject, there is a great conflict of opinion and of doubt.

Let me say this—that if those chemical changes which we denominate as fermentation and putrefaction, are wrought by the instrumentality of these bacterian bits of plants—and alone by them—if this be established as impregnable fact, then all past theories of disease must sooner or later be greatly modified.

The prognosis of this agitation is favorable.

The present condition is symptomatic of those mental throes which precede the birth and reception of new truth.

Great and wonderful benefits will as surely come as day dawns after the night.

Their benefits have already begun to appear to dental practitioners.

We, as dentists, have reason for congratulations that we have among us men who have commenced their investigations on this subject at foundation lines, and from those initial steps have demonstrated certain facts which are already becoming the basis of a more intelligent practice.

With their investigations and experiments you are all more or less familiar.

Whatever may come to be considered as the true relation of micro-organisms to general disease, by the medical practitioner—there is no room for doubt that they are proven factors in the production of dental caries.

Let me ask in conclusion:-

Does it not, in the presence of these wonders, require vastly more credulity to reject the conviction that we dwell within the realm of the Infinite One—the Almighty Father of life, light and truth—than it does reverently to yield our faith?

I think so.

Herbert Spencer's name is commonly placed upon the list of Agnostics, and yet, I find he has said:

"Amid the mysteries, which become the more mysterious, the more they are thought about, there will remain the one absolute certainty, that we are ever in the presence of an infinite and eternal energy, from which all things proceed."

RETAINING PLUGS USED IN REGULATING.*

Wire Retaining Pegs.—Wart Retaining Fillings.—Philosophy of Excavation.†
BY J. N. FARRAR, M.D., D. D. S., NEW YORK.

For some cases, if nicely made, these auxiliaries may be classed among the very best devices for retaining purposes. As their practicability depends so much on the manner of their construction they will be explained in detail. Beginning with the consideration of pins set in cavities we will then proceed to the consideration of the wart-plugs.

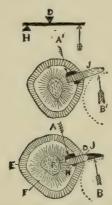
Wire retaining Pegs.—Pins to be fixed into cavities are of gold or platinum wire, one extremity of which is roughened or screw-cut and the other smooth. When there are natural cavities, pins are easily set with cement; but if the holes are to be drilled for the purpose it becomes a matter of nice calculation, for they should not be so large as to make it necessary to have a ring of cement around the pin to be exposed, nor should they be so small that the threads of the screw will crumble the enamel; but they should be sufficiently large to permit the pin to enter snugly. Figs. 1 and 2 illustrate sectional views of lower cuspid teeth, showing the

^{*} Advance sheets from Dr. Farrar's work on "Irregularities of the Teeth," published in the INTERNATIONAL by special permission of the author.

[†] Copyrighted.

relation of the pin, J, to the enamel, E, dentine, F, and pulp, P. The figure at the top shows the philosophy of the leverage; D, fulcrum, H, resistance or weight, arrow; the power or point upon which the regulated tooth bears.

It is very important that the bearings of the screw or pin, when pressed against by the recently moved tooth, B, as indicated by the arrows, should rest against the tooth tissue at the entrance at D, Fig. 2, and also at the bottom of the cavity at H, and although



Figs. 1 and 2.—Screw Retaining-pegs (A).

in contact, not to rest on the cement in which it is set. It is necessary in order to obtain firmness, however, to shape the pit so that there will be a little extra room in other places for a small quantity of cement, as indicated in black. When the dentine is thick enough, this chamber should be made entirely within it, as shown in Fig. 2, not sacrificing the enamel, as shown in Fig. 1. In this way the fulcrum, which is the enamel, p, will be strong and not crumble. After the corrected teeth have been retained in place long enough the pegs should be removed and the cavities filled with gold.

Wart retaining Plugs.—When teeth overlap, they may sometimes be retained in position after correction by simply inserting wart-plugs in natural cavities, if there are any in the approximal surfaces or in artificial cavities if the urgency of the case demands it, which is seldom. Fig. 3 illustrates the principle of wart-plugs, which, if rounded off and polished, are not objectionable. Indeed, I never saw, except under circumstances hereafter to be explained, more satisfactory results from any kind of retainer, because these



Fig. 3.—Wart Filling for Retaining Purposes (A).

may remain permanent without disfigurement or inconvenience. The durability of wart-plugs depends entirely upon the skill exercised in the operation; "no slip-shod" method of inserting gold will be effectual. The plug should be made of adhesive gold inserted after the laminated method of filling teeth—that is, the foil should lie like the leaves of a book, one piece flat upon another, beginning at the posterior part of the cavity and extending outward.

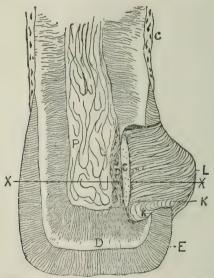


Fig. 4.—Longitudinal Section View of a Tooth and Wart-plug (A).

Fig. 4 illustrates a longitudinal section view of a central incisor having a natural cavity, showing this laminated construction of a gold wart-plug, as made by the author.

Fig. 5, a transverse sectional view of the same tooth cut in line of x, x, illustrates the same—L, the plug; E, enamel; D, dentine; P, pulp; s, D, calcified portion of pulp, ("secondary dentine"); c, capping material. The wavy lines shown in the plug, L, in Fig 4, indicate the relation of the layers of gold with the tooth.



Fig. 5.—Transverse Section View of a Tooth with Wart-plug.

Beginning the operation in the usual way against the cervical wall of the cavity with soft foil, shown in black in Fig. 4, it is followed by piece after piece of laminated gold, cut either from a carefully prepared roll, or better, from ribbon made of several thicknesses of cohesive sheets (perhaps heated). These are malleted together at all points, but more especially at the outer ends of the pieces, in order to bend them toward the gum, and give a solid surface. When the cavity is nearly filled, a key, k, of roll or rope foil, is forced into the undercut, as shown by curved lines. This key renders the wart-plug very secure, and when all is properly finished and polished, it is not objectionable to the eye.

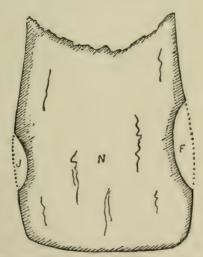


Fig. 6.—Central Incisor prepared for Filling (front view).

Fig. 6 illustrates the appearance of the anterior surface of a central incisor as prepared for the filling. This method of cutting a hatchway through the anterior portion of the tooth renders the

operation of filling easier than to operate from underneath, and also leaves little or no disfigurement of the tooth. It is commonly thought that a filling should never show if possible; but this opinion is not always sound, for gold thus inserted between the teeth often reflects a dark line to the eye which, had the gold been made to extend a short distance around on the anterior surface of the tooth, would form in the light a bright line which would catch the eye and render the dark line beyond unobserved. This is a form of plug that is not only more durable, but causes no disfigurement, and is not very noticeable.

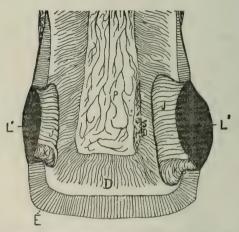


Fig. 7.—Wart-plug (section view of tooth only).

Fig. 7 illustrates a longitudinal section of a central incisor having two wart-plugs. The tooth is represented as divided after the plugs were inserted, so as to show the relation of the outer surface of the wart-plug with the inner portion and the inner parts of the tooth. In other words, the anterior half of the tooth is removed, leaving the plugs intact. The external surface of the plug, L', L', is shown in black, the internal, J, J, in lines. This figure also illustrates the form of the cavities.

Philosophy of Excavation minutely considered.—In the preparation of the cavity it probably is not necessary to mention to the majority of operators that to excavate in accordance with the "cleavage," or "grain," so to speak, of the enamel, is an important point, and one which should not be lost sight of. But as it may be instructive to students, an extract from a paper by the author, pub-

lished in January, 1879, is given here. As this point cannot be so clearly shown in a diagram of an incisor, it will be illustrated in a section view of a molar, drawn not only to show the philosophy of proper excavation of a cavity, but the details of management of the worst conditions, including an exposed pulp (Fig. 8).

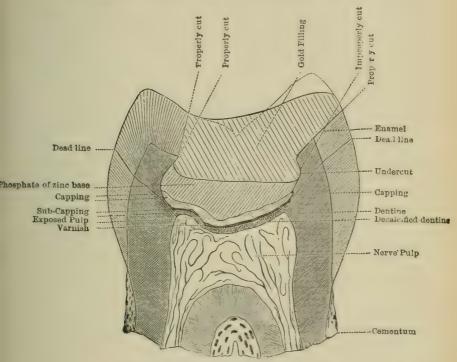


Fig. 8.—Philosophy of Excavating a Tooth.

In this figure the position of the enamel rods is illustrated by lines radiating from the dentine, and the heavier lines on the margin of the cavity show how the enamel may be cut without weakening and rendering it liable to "chip out" around the filling. It also shows by other lines where the rods may, and also where they should not be, diagonally cut, in order to prevent chipping. This would occur if they were cut along the dotted line on the right, but would not if cut as shown on the left.

In preparing the dentinal portion of the cavity when the pulp is exposed, it is well also to cut away the walls and floor, so that not

^{1 &}quot;Missouri Dental Journal," January, 1879.

only the filling, as a whole, may be firmly anchored, but that the ends of all dentinal tubes, leading directly from the cavity to the pulp, may be covered with varnish (the best kind of which is fir balsam dissolved in chloroform).¹ But to accomplish this double object, all cavities in the grinding surfaces of teeth, where great pressure is to be made, should, if possible, be so shaped that when the zinc cement base is inserted and has hardened, it may rest firmly, not to bear hard upon the thin dentinal flooring over the pulp, nor upon the capping varnish, if any is used, but upon the centrifugally inclined floor of the walls of the dentinal structure around about. In approximal cavities, however, where there is not much pressure applied, this precaution is not necessary.

In case of exposed pulp, having applied wood creosote and deposited the proper quantity of varnish—which should be very limited—upon the exposed point, it should be carefully made to spread over the floor of the cavity with a delicate instrument until all the dentinal tubes leading from the cavity directly to the pulp are covered, in order, as before implied, to cut off all irritation that may cause pain. This may be easily understood by reference to the figure, where the dead lines show the division between the dead and the living portions of the dentine and enamel.

While the application of varnish is important in order to prevent pain, it should not extend much beyond the "dead-line," and smear any more of the walls than is necessary; for in that case it may injure the firmness of the main filling.

Having deposited the varnish, it is not necessary to wait for all of the chloroform to evaporate before applying the thin covering of phosphate of zinc, which should be of the consistency of cream, so plastic that, if applied delicately, it can be spread over the entire surface of the varnish without displacing it. The smooth coating of varnish is soothing to the pulp and insulates it, as it were, from the cement. Should, however, the varnish coating be injured, pain will generally follow in proportion to the extent of the injury of the insulator. This varnish prevents disintegration of the cement, which is sure to follow in time, if the juices of the pulp are directly exposed to it.

Having the pulp protected, and the varnish hermetically sealed in by the cement, the chloroform is retained and made useful by

¹ The genuine fir balsam is not often found in market; the imitation is pine pitch, which will not harden, therefore is not fit for capping purposes. I get fir balsam direct from the forest by gathering the "tears" that ooze from cuts in the trees.

acting upon the exposed portion of the pulp beneath; and the morphine mixed with the wood creosote acting upon that portion of the crown of the pulp which is not exposed, the entire pulp is soon rendered sufficiently insensible to any slight irritation that may take place—a condition tending to obviate any "shock" and which will continue until nature has time to act and becomes habituated to the new environments—a point of great value to both patient and operator.

Having accomplished the important point of painlessly protecting the pulp, a proper additional amount of cement, harder than that used for the flooring, should be introduced, after which, when it is sufficiently hardened, it may be dressed and shaped in readiness to serve as a basis or foundation upon which to build a wart plug. This operation, though applicable to approximal cavities in the front teeth when it is possible to carry it out, is especially valuable to molars requiring wart-plugs for keeping the jaws apart while "jumping" a tooth, or in operations for correcting protruding teeth where the lower incisors are so long that they bear upon the upper teeth.

SOFT FOIL AND PROGRESSIVE DENTISTRY.1

BY E. B. DAVIS, D.D.S., CONCORD, N. H.

The last few years have seen the most important improvements in the science and art of dentistry, and the deepest and most conclusive investigations into the histological and pathological branches of the study that have ever taken place. In fact, I think no other profession will show an equal progress in its deeper branches in the same length of time.

Even from my own standpoint of only fifteen years the progress is almost incredible, and it is only by closely observing the steps that the profession has taken in its advance, that we are able to keep up with the procession in its onward march towards the high mark, set by the men eminent in ability, and who would, from their varied accomplishments and talents, adorn any position in life. The leaders in American dentistry have been leaders in every sense of the word.

To-day is a day of progress. The times are pregnant with that "one idea" progress. No man at the present time can do himself,

¹ Read before the New England Dental Society, November 15, 1888.

or the cause which he champions any credit, but through the most earnest efforts to keep up with the advance that is taking place in this, as well as other professions.

That very stormy discussion on the so-called "new departure in filling teeth," commenced about ten years ago, by Professor Flagg, I think, taught us a great deal in regard to the use of plastics, and, as far as I know, although no number of men accepted the extreme views advocated, yet a great many profited by the discussion, and now use better plastic fillings, and use them more intelligently.

The long and very able discussion on pyorrhœa alveolaris has aroused the profession into taking a deeper interest in that very aggravating disease, and our progress in treating it is a long way in advance of the position occupied a few years ago.

The very able discussion and papers on crown and bridge-work that have occupied our attention as a profesion for several years, will ultimately land us in a position far in advance of that which we occupied before they were commenced.

The very important investigations that have been taking place in regard to the etiology of decay have, at last, we have reason to believe, come upon solid ground, and from the progress of the investigations results will be obtained by the profession for which it has so long tried, namely: something to prevent decay in teeth, in a measure at least; yet not to the extent that all dentists will go out of business, but that much suffering will be prevented, and many of the abominations in the form of prosthetic dentistry will no longer disgrace the features of the American people, and that will, in the highest sense, be a step in the direction of progress such as the whole civilized people will delight to see.

Each and all of the men engaged in these investigations, and others of less practical importance, are doing a grand work for humanity, which will be felt for all time to come; and we cannot do less than give them the credit due, and honor them for the work they have done, and are still doing. I think, and all will concede, that dentistry is a very progressive profession, and takes but few, if any, steps backward.

I have been led into taking the subject that I have chosen for this paper, "Soft Foil and Progressive Dentistry," by several considerations. And first is the fact that we have all heard the distant murmurings of a recurrence of this, one of the oldest and most hotly contested of dental discussions. It has been coming nearer, and I think has finally been placed before the profession by one of

the leaders in this very branch of our work, Prof. James Truman, of Philadelphia, in a paper read before the Pennsylvania State Dental Society. And another consideration was, that I have never found a young dental operator, that claimed to be an expert, or even understood the first principles of working soft foil, although not one would admit that he was not expert in cohesive foil working, and took great delight in criticizing the work of others in this branch of our profession.

Another thing that brought this subject to my mind was the very severe criticism by a dentist of Washington, D.C., in the Dental Office and Laboratory for July of this year. It was this: "I believe cohesive foil in the hands of two-thirds of the operators of the present day is a delusion and a snare." And I thought if this is what the dental profession has come to, with all its boast of progress, after over thirty years of work on this one branch of our profession, the very branch that has received the most practical attention of any in the whole range of our practice, surely this severe and sweeping criticism should not be accepted without the closest examination.

I confess I cannot affirm or deny this statement, and will leave it for those that come after me; but I will state right here that I am, and always have been, a thorough believer in soft foil, and from my own standpoint it does not strike home very forcibly, though there is no one who regrets it more than I, if it is true, or even has any foundation in fact.

The murmurings that I have spoken of come to us in this form: It is conceded by able men in the profession that soft foil is good to line cavities with. Use just a little of it, and make the bulk of the filling of cohesive foil. Why not use the larger amount of soft and the lesser of cohesive foil? And that is what the next step will be. The profession is having its attention called to this form of filling by leading operators, and when the profession generally comes to understand the easy and rapid work that can be done by an expert soft-gold operator, in comparison with the slow, and oft-times tedious method of the cohesive gold operator, I think a gradual change will take place in the mode of using gold as a filling material.

I don't think there can be any question in regard to soft gold not being a good tooth-saving material. I thing that the expert operators of thirty or more years ago have demonstrated to all succeeding generations that it comes the nearest to an ideal filling material for a large number of cases of any that we have ever had. It can be inserted rapidly, condensed solidly, without the use, in many cases of the rubber dam, and will prevent the recurrent decay in a manner that cohesive gold, from defective manipulation, oftentimes fails to do. And, furthermore, I think that the large number of dentists that learned to use soft gold in a thorough manner, and have never discontinued its use, but have used the other forms of gold in connection with it, have been doing better by their patients than a majority of those who have been doing an exclusive cohesive foil practice. And I am sure these men will hail with delight the evidence that some of the leading operators are again receiving this old and dear friend to their practice, acknowledging its merits, and using it in those cases where its use has proved of so much value in preventing recurrent decay. I look upon this return to the use of soft gold as an act of progress in our profession.

It is not my object or purpose in this paper to disparage cohesive foil as a filling material. There are many cases where it is preferable and where no other form of gold should be used. And I say that it should be used in cases where it ought to be used, and soft foil in all cases where it can be used. I have filled but very few cavities without using cohesive gold in connection with the soft gold, but the amount of soft foil used has greatly predominated over the cohesive. By this method contour can be restored as well, and in much less time than by the old cohesive method. Grinding surfaces, and those surfaces to be exposed and highly finished, are in all cases to be of cohesive foil; but as a young man, I wish to place myself on record as a strong champion of soft foil, alongside of many of the old practitioners of the day.

In any profession or trade it is right for a man, when he finds a material that he can use successfully, and knows what he can do with it under all circumstances, so long as the standard of excellence is maintained, to stick to that material in preference to continually experimenting with all the different materials that may be brought to his attention; and it is not my object to try to influence any man to change his mode of practice, if he is satisfied with the results he is attaining with cohesive gold, and can afford to spend from thirty minutes to one hour in filling a cavity that could by the use of soft gold by an expert operator be filled in ten or fifteen minutes. For, in the discussions and papers that have of late been given on this subject, time is one of the principal reasons given in favor of returning to the use of soft gold.

And, furthermore, I would like to inquire if the very general use of cohesive foil for the last twenty-five years has so fully demonstrated to us that it is the best form of foil to use in all cases, and by all operators; that there is no need of any other form but cohesive, and if their belief in cohesive gold is growing stronger as time and experience go on?

If I thought these questions could be answered in the affirmative, I could have no object in presenting this paper to you to-day. I think the facts and evidence are not wholly in favor of cohesive gold for filling teeth.

We cannot expect the profession to "about face" on this subject, and after the long and honorable stand it has occupied in favor of cohesive gold, the return to the use of soft gold will be gradual, and the more certain for that. The first steps have been taken by leading men in the profession advocating the use of soft gold in lining cavities, the larger part of the filling being built up of cohesive gold. This is a very important step, and one that recognizes the peculiar virtues of soft foil, and, to my mind, the beginning of a more general use of this form of gold as its working qualities become better known to this generation of dentists.

This advice in regard to the use of soft gold has been thrown out in a very gentle manner, and not in a way to attract the attention of the profession generally. At the dental conventions that I have attended of late this subject has received little or no attention, either by essayists or in discussion; but at the meeting of American Dental Association, held in this city in 1880, I listened to a very interesting discussion on it. The advocates of cohesive gold were led by the lamented Dr. M. H. Webb, full of faith that that was the only correct method of using gold, and that all failures from it were the result of defective manipulation. Opposed to him were the older members of the profession, still in love with the material that they had learned to use when it required years of time to become expert with it, owing to the want of appliances that we have at the present day.

The discussion was intensely interesting to me, and from the knowledge I possessed of both methods, I could appreciate the points brought out, and notwithstanding the fact that the cohesive gold side was most ably presented, I could not be persuaded to think that cohesive foil was the only form in which gold should be used to prevent recurrent decay in teeth; and the longer the discussion continued, the stronger I became and the more faith I had in the teachings I had received as a student, to wit: that in a large

majority of cavities where gold should be used for the prevention of the further progress of decay, soft foil is the best form of gold to use. The experience of eight years of practice since that time has not changed my opinion in regard to this subject.

In the paper by Prof. Truman that I have referred to, he finally concedes the fact that a good filling can be made with soft and cohesive foil used in connection, and, further, that perhaps it is the best way to fill teeth, all things considered. The only serious objection he raises against soft foil is that it is difficult to teach the principles of using soft gold, while the cohesive foil method can be taught to the man of the dullest comprehension.

The place for the student to acquire the methods and principles of using soft gold is with his preceptor, if he has one, and not leave it for the professor of Operative Dentistry to teach him all his methods of practice.

One statement made in his paper, however, I would question: he says; "Any one who has mastered the art of manipulating cohesive foil cannot fail in the use of soft foil." And further: "The transition from cohesive gold is easy and natural, the former having been properly acquired; but the change from soft to cohesive is almost an impossibility."

It may be presumptive (for me) to question the statements of such a man as Prof. Truman, but all my teachings, and the results of my experience have proved to me the exact reverse. And in proof of this side of the question, I would cite the fact that those operators are able to do equally good work with any form of gold; while, on the other hand, thousands of dentists who do good work in cohesive foil are totally incapable of working in soft gold, and knownothing of its peculiarities. I affirm that an operator who can use soft foil expertly can use any kind of gold in any manner, or any other filling material that we have had thus far in our profession.

In evidence that I have from some of our leading professors of Operative Dentistry in our Dental colleges, I learn that they are teaching the use of soft foil to a considerable extent, some of the professors not considering a student competent to enter upon practice until he is qualified to use gold in all its forms. If a student comes to a college from a preceptor who uses both soft and cohesive gold, and has acquired a knowledge of working gold in all its forms, his advance will be as easy and rapid as his qualifications will admit of; but, on the other hand, if he has acquired during his studentship a knowledge of cohesive gold only, the college should do all in its power to perfect him in soft gold manipulation.

Reports of Society Meetings.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE REGULAR MEETING OF THE ODONTOLOGICAL SOCIETY OF PFNNSYL-VANIA WAS HELD SATURDAY EVENING, JANUARY 5TH, 1889, AT THE HALL, THIRTEENTH AND ARCH STREETS.

President Kirk in the chair.

A paper on

THE ADVANTAGES OF COTTON AS A ROOT CANAL FILLING.

WAS PRESENTED BY JOSEPH HEAD, D. D. S., PHILADELPHIA.

At the tenth anniversary meeting of this Society, held in December, not a single objection was raised against cotton root-canal fillings, which, in my opinion, did not equally apply to those of gold, oxyphosphate of zinc, or gutta-percha.

It was said that cotton was prone to absorb fluid from the tissues around the apex of the root, which fluid, undergoing decomposition, was likely to cause alveolar abscess.

For the present, this statement shall remain undisputed, although I hope, before the reading of this paper is finished, to prove to your satisfaction that such is not the case.

It is unnecessary for me to describe the method of treating single rooted teeth, such as the canines and incisors. Since the orifices of the canals are evident and the line of direction straight, enlarging, cleansing, and thorough adaptation of the root filling is extremely easy. In fact, so few difficulties are these teeth likely to present, that the student may be quite as successful in their treatment as the expert.

Therefore, let us consider only the teeth which are difficult to quiet, feeling well assured that in learning to apply the proper therapeutic skill to these, we shall at the same time be mastering the methods to be used in combating all the lesser evils.

In pursuance of this idea, I would invite you to consider with me the treatment of bicuspids and molars. Yes, the manner of dressing and filling molar roots shall be the subject of discussion, for these as a class are likely to give more trouble of a peridental nature than all the rest of the teeth combined.

Why? Because this class, not only being larger than any of the others, contain forty canals, each capable of causing an alveolar abscess, while all the other teeth can muster only twenty-four. And because a tooth containing two or three canals is two or three times as likely to give trouble as a tooth which contains but one. With this hasty explanation let us now proceed to inquire if gold cement or gutta-percha can justly be said to make a permanent or perfect filling.

At the late anniversary an eminent practitioner told me that he first measured the end of the canal and then filled the apical end solidly with gold. So great was his regard for his method, that he did not approve of cotton fillings.

I wondered how he would manage to do this to the anterior buccal canal of a superior molar. I should have been satisfied had he told me how he would measure and fill solidly, with gold, the flat roots of lower molars, the canals of which so frequently sub-divide, leaving between the two branches a translucent plate of cementum.

It occurred to me, that while enlarging these sufficiently for the complete accomplishment of his design, that there would be danger of boring into the alveolar process, the blood thereby spoiling the perfect adaptation of the gold. Should his practice become general, it would probably work great injury to all roots containing minute, flat, or tortuous canals. As in so treating them would he not, in all probability, either perforate the root, or leave untouched a large portion of the canal, into which it would be impossible thoroughly to pack the gold? There being no method of venting the tooth, would he not incur the risk of alveolar abscess with all its horrors?

Another experienced practitioner said that after sterilizing the canals, he pumped into them gutta-percha dissolved in chloroform, and then packing the root with gold, made, as he said, a filling so impervious to fluids from without, that alveolar abscess was an impossibility; or, at least, so improbable that its occurrence was not to be considered.

This method at first sounded plausible, but, after deliberation, it appeared to me that his materials were not equal to good guttapercha. The gold in his case, occupying the position of an inert mass, could only serve to block the canals should trouble arise. While all the responsibility of excluding noxious fluids was given to gutta-percha, the real strength and toughness of which had been destroyed by the chloroform.

It is not necessary to prove to you that dental gutta-percha is porous, that is, it does not make a water-tight filling. These facts are too well known, but if a skeptic be present, a single sniff at the gutta-percha found around most of the pivot teeth set in that

material will fully satisfy his doubts as to its porosity; while the fact that it leaks has been proven again and again by the glass tube and analine ink test.

Therefore, if dental gutta-percha be not a bar to the fluids of the blood, and if it cannot be denied that it absorbs decomposable liquid, and not being a vehicle which will combat putrefaction, how can it be called a perfect or permanent filling?

How is it possible to suppose that a root so filled can be granted immunity from gases which cause alveolar abscess. How can it be believed that this much lauded material is even as good as the despised cotton, which does not pretend in itself to exclude moisture, but acts solely as a vehicle for retaining medicine which will keep out fluids and at the same time prevent the development of putrefactive germs still lingering within the canals.

Dental gutta-percha not only offers free entrance to fluids of the blood, but, being inert, affords them an excellant harbor where they may multiply with the greatest rapidity.

But perhaps some of you at this moment are anxious to rise and speak as follows: "How is this, my young friend? Guttapercha porous? Consider that the Atlantic Cable is wrapped in gutta-percha, and if a single drop of water should leak into it so as to touch the metal, the cable would be useless." To this I should reply as follows: "Respected sir, I am not speaking of pure gutta-percha, but of the material used by dentists. Pure gutta-percha has not sufficient body to be used in our profession. Oxide of zinc, which is extremely soluble, is usually mixed with it, and when the zinc is dissolved, the gutta-percha becomes like a sponge."

But granting that the gutta-percha be mixed with an insoluble powder, still gutta-percha, being a leaky material, allows the fluids to enter beside the earthy particles of the powder, and is, therefore, only slightly less pervious than when oxide of zinc is used. Should base-plate, which is almost pure gutta-percha, be used, the same objection may be made, as it is also mixed with a powder and presents the insurmountable difficulty of not making a water-tight joint, thereby incurring the risk of alveolar abscess.

What has just been said of gutta-percha is equally applicable to cements. True, they make a tight joint; but then they are so porous that they have all the harmful properties attributed to gutta-percha, and also an important additional one, namely: that it cannot be removed, and, if trouble arise, relief is impossible except by counter-irritation or puncture of the alveolus.

Counter-irritation, in most cases, seems like trying to put out the sun with a squirt-gun; for, if the abscess has to run its course, the slight success which a dentist's conscience permits him to attribute to his efforts is often unperceived by the patient. While puncturing the alveolus is not only a severe operation, but too often unattended with any other result than an increase of pain, failure is either due to the fact that pus has not yet formed, or that the pus cavity has been missed by the drill. While we are on this subject I should like to ask two questions about alveolar abscess.

Does not the patient suffer prolonged and excruciating pain before pus is formed? Before the pus is generated in a quantity sufficiently large to be successfully pierced, has not the patient endured by far the greater part of the pain which would naturally fall to his lot?

Gentlemen, I think you will answer both these questions in the affirmative, and, therefore, taking into account the uncertainty and discomfort occasioned by the drilling, the expediency of relying on this operation as a means of relief can be questioned with some appearance of logic. Therefore, it would seem that the dentist who accepts these facts, and yet, in a case of simple treatment, knowingly uses an irremovable canal filling which has the defects above explained, wilfully subjects his patients to the risks of not improbable alveolar abscess with all its accompanying horrors.

Gutta-percha, in roots where pivots are placed, can, as a rule, be readily removed from the canal, should venting be necessary. Hence, this material should always be preferred whenever its use will ensure sufficient stability; and where cement is necessary to render venting easy, a small piece of gutta-percha, or a small pellet of cotton dipped in an antiseptic, should first be placed at the apical end.

The advocates of the so-called permanent root fillings, gold, gutta-percha, and cement, claim that these agents absolutely exclude putrefactive germs. And, moreover, the root being sterilized previous to filling, that these materials so protecting it will soon make alveolar abscess one of the lost diseases. Are these statements borne out by facts? Do not these fillings contain all the disadvantages which have been attributed to cotton? It is said that cotton is not water-tight. Are the other materials water-tight? It is said that it absorbs fluid which, decomposing, gives rise to irritating vapors. Do not gold, gutta-percha, and cement also give rise to irritating vapors?

But the great advantages of cotton dressings have not been justly rated.

Firstly, it can be easily removed. Secondly, it can be thoroughly permeated with medicaments which will not only destroy septic matter, but prevent its entrance.

In reply to the first of these statements, our learned friends claim that alveolar abscess, in teeth treated by their method, is so improbable that the removal of the filling is never necessary, external treatment meeting every requirement.

Well brother practitioners! if, after the review which has just been made of the obvious imperfections of gold, gutta-percha and cement as canal fillings, these gentlemen still adhere to their opinion, it must be confessed that I am unable to find any argument which might convert them.

Therefore, without further discussion of the great advantage which cotton has in its easy removal, I will pass at once to the consideration of cotton as a medium for antiseptic medication.

It has been said that "The medicament evaporating, leaves the cotton unguarded."

Gentlemen, have you ever heard of carbolized cosmoline? and will you kindly inform me what is its daily rate of evaporation?

It is with carbolized cosmoline that a cotton dressing should be soaked.

The late Dr. H. A. Randolph boiled a frog's foot in pure cosmoline in order to destroy any putrefactive germs which might remain, and then allowed it, covered by the paste, to stand for an indefinite time. Week after week the foot stayed unchanged, the experiment proving that cosmoline is aseptic in the highest degree, and that a sterilized body placed in it will remain intact so long as it is covered.

Therefore, gentlemen, it seems to me strongly indicated by the majority of facts; for these experiments can be verified, that, while gold, guttapercha and cement have all the faults attributed to cotton, cotton is in reality the most permanent and easily adjusted of root fillings.

The use of cosmoline in canals is not original with me but was first suggested by Dr. St. George Elliot, of London.

Having now given you my defense of cotton dressings, let us, with your permission, proceed to consider how and when they should be inserted.

Any practical method of cleaning and sterilizing the canals can be used, but where the pulp has putressed, I invariably employ the gradual stopping process which is so clearly explained by my beloved and respected friend, Dr. Flagg. Of course, you are all familiar with it; but to keep the links in my chain

of evidence perfect, with your permission I will explain his manner of treatment, which has the advantage of cleansing with equal thoroughness the small and large canals.

The tooth must first be opened and the floor of the pulp chamber so burred that the mouths of all the canals visible or invisible shall be exposed.

Then if considered practicable they can be enlarged, extreme care being taken not to puncture the cemetum.

At the first sitting all the decomposing material that can be reached should be removed. And after the passages have been thoroughly washed by streams of warm water squirted into them from the syringe, they should be dried and protected by the napkin or dam. Finally being filled loosely with a cotton dressing thoroughly soaked in pure carbolic acid, or whatever medicament may be preferred.

This, of course, should be done early in the morning. The advantage of choosing such an hour has been known to dentists for a long time. Its scientific explanation is easy.

The velocity of the blood is greatest at nine o'clock in the morning and six atnight. Its ebb tide is about one P. M. and at midnight. [See Dalton's Physiology, p. 313.] This fact effectually answers all speculation on the subject. When the rapidity of the blood is increasing, any irritation will end in inflammation much more readily than when the velocity of the vital fluid is on the ebb. Therefore, judging from this fact, were we so inclined we could treat teeth with equal advantage, at six or seven P. M. But, of course, this not being feasible, the morning hour is the hour usually chosen. On the following day the syringing and replacing of the dressing should be repeated, the dressing being packed a little tighter. This should be continued each consecutive morning until twisted cotton, soaked in carbolic acid, can be firmly packed into the canals and there remain, the tooth being absolutely free from inflammation.

Extremely sensitive teeth with open canals have yielded to this treatment again and again, becoming sound and painless in a few days. Should the tooth resist the first treatment in the morning, allow cotton to rest in the canals very loosely, and tell the patient to return at eleven, when the treatment again being performed, the pain will, in almost every instance, abate.

By following this plan, any little accumulation of gas may be removed, and yet the advantage remain of treating while the blood is still on the ebb.

By this method the hair-like canals are perfectly cleansed: for the organic matter putrifying in them is each day washed out, while each cleansing is followed by an application of carbolic acid, which if the tooth is dried, will go into places inaccessible to cotton.

With these means I think you will confess that any canal, no matter how minute, can be cleaned and sterilized. This being accomplished and the last dressing allowed to remain, the tooth should be temporarily filled with gutta-percha or cement for a length of time sufficient to test the thoroughness of the work; which having been satisfactorily demonstrated the tooth may be permanently filled. The details are as follows:

Put on the rubber dam, remove dressings and blow hot air into the tooth until it becomes painful. Then, using a hypodermic syringe filled with warm carbolized cosmoline, pump the canals full.

In dealing with the large canals this will be an easy process. In those of a small diameter the passage of the cosmoline to the apex will be aided not only by capillary attraction, but also by the contraction of the cooling air. By finally pressing a pellet of cotton soaked in cosmoline over the small orifices, and then inserting a minute shred of cotton wherever possible, it seems reasonable to suppose that the canal can be filled to the apical foramen, with an antiseptic substance sufficiently viscid to exclude moisture from without. Cotton should then be packed in the large canals to act as a support for the medicament.

The canals should be filled with cotton to the pulp chamber, and a small pellet soaked in cosmoline placed over the orifices of those which are too small to allow the entrance of a thread. The cavity should now be washed with chloroform to remove superfluous grease, and the pulp chamber filled with gutta-percha or cement. I connect the mouths of the canals with protected cotton in order to expedite venting, should it be necessary. This is merely my personal preference. It is not essential. The filling to be used in covering the contents of the pulp chamber of course must vary according to the individual peculiarities of the tooth.

How is it possible for a tooth thus treated to need venting?

Because in every case there is a strong probability that the outer portion of the apical foramen may be unprotected, and, moreover, the place where the living and the dead tissues join is always a weak spot. And after all has been said and done, and the greatest care has been used, a gouty, lymphatic or plethoric patient may most unexpectedly give us a very serious example of peridontitis.

I must add, in closing, that the dentist who can always be certain of his work, in such patients, must not only be extremely sanguine, but remarkably fortunate.

This paper has been written for the purpose of showing that cotton is a legitimate root-filling. If, in the course of my argument, the disadvantages of gold, cement and gutta-percha have been brought to light, it was purely accidental.

My intention is not to prove the advocates of recognized and well tried methods unlearned, or, what is worse, unprofessionial, but to remove the stigma from the advocates of cotton dressings. No man can justly be called unprofessional, until it is clearly shown that he advocates a method contrary to the highest teaching of the day. And, before a method can be proven illegitimate, its adversaries must first clearly demonstrate that they know a process indisputably better.

These statements being accepted, it alone remains for the advocates of gold, gutta-percha and cement to prove that these materials do not have the faults attributed to cotton, and also to prove that the obvious advantages of cotton do not more than compensate for its disadvantages, whatever they may be.

All are anxious to have this question settled. If the use of cotton-fillings is bad practice, point out concisely in what respects the use of gold, gutta-percha and cement for root-filling is superior.

Let the following questions be distinctly answered:

- 1. Can gold be packed in the delicate canals of molars so as to exclude serum.
- 2. Does not gutta-percha leak, thereby allowing free entrance of putrefactive agents into the sterilized canals?
 - 3. Does not cement, being porous, offer similar objections.?
- 4. And cannot a perfectly water-tight, easily-removable filling, be made with cotton dipped in a thirty-five per cent. mixture of carbolized cosmoline?

DISCUSSION ON DR. HEAD'S PAPER.

Dr. James Truman—I do not feel any more convinced in listening to Dr. Head's paper than I was by his remarks at the Anniversary Meeting, when I expressed my opposition to cotton filling. I have some forty years behind me in the treatment of root canals, and over thirty years in which I have practiced all the various modes of filling except that with cotton. When I hear it stated that gold fillings in root canals are failures, my mind goes

back to the operations of our older practitioners, Maynard, Townsend, Westcott, Dwinnelle, and others, and wonder if all their operations were failures. I used tin and gold exclusively for this purpose for many years prior to the introduction of oxy-chloride of zinc, and the cases were few where I failed to accomplish good results. We are unfortunately only too well aware that it is impossible to fill all roots perfectly, notably the buccal roots of the superior, and the anterior roots of the inferior molars; but can Dr. Head, and those who think with him, have better success with cotton? It seems to me impossible to force this into tortuous canals any better than the denser materials.

The experiment with gutta-percha in glass tubes might be conclusive if glass could be depended on. It is not a reliable material to fill against, being subject to expansion and contraction, and must eventually permit the analine to pass in at the edges. We do know clinically that gutta-percha will prevent leakage for years and years, and I think it will be difficult to show teeth better preserved than with this material. I cannot discuss the filling of canals with cotton and cosmoline. There is a possibility that cosmoline may have an advantage over carbolic acid alone, for that agent has its limitations as a germicide.

We do not want to remove a filling after it is once inserted. To fill with this idea is, to my mind, a fallacy. If we have treated the canal properly in the first instance, we want a filling placed where it will stay. I pack the gold in the canals with the mallet, and know that it will not leak there any more than it will externally.

I took the position—and the paper is an answer to one I read at the Anniversary Meeting-that before filling a canal it must be properly treated, and I further contended that no tooth was properly prepared where the canal was not free from decomposed tissue, and I stated, further, that as the dentine was made up of innumerable tubes, and that these tubuli contained organic matter, and if this material, undergoing decomposition, is not included in the treatment it becomes a constant source of danger to the tooth. I enforced the opinion that it was necessary to reduce this to an insoluble compound, and that this was best done by keeping the canal under the action of oxy-chloride of zinc. This, in my judgment, is at present the best known filling material for canals. I am aware that cotton is a good filter for micro-organism, and as long as it is not disintegrated in the canal it may be an effective agent; but when this does occur the results were exceedingly disastrous.

Dr. J. D. Patterson, Kansas City—Twenty years ago I had the misfortune to use cotton fillings, following the precedent of my preceptor. We did not use carbolized cosmoline as a dressing, but what was common at that time, creosote and carbolic acid. The frequent failures resulting from that practice, together with the advice and experience of others, caused me to soon discard it, and for a great many years I have employed another method. I do not wish to criticize. If it were not for the variety of opinions it would be useless for dentists to come together for discussion. I have great respect for those who take a bold stand and back their assertions with logic.

With all deference to Dr. Head, I have no confidence in the method he represents. It is no doubt better than the old method of carbolic acid alone, or better than the old English method of using cotton with sandarach. I think other methods are better in point of efficacy. There is an objection in mind to gutta-percha, so universally used throughout the West, and that is its tendency to leakage, I have found the fault present many times.

With regard to Dr. Head's experiment with the glass tube, if he will conduct one more he will have a different result. Take one of those tubes and by melting draw it into a fine thread, afterwards grinding it off. Then pack into it a gutta-percha filling up against this small opening, sealing the rest of the tube carefully; put the tube in a vessel of analine, or any other fluid, and you will have no leakage. I prefer to fill the apical portion of the canal to a small distance with gutta-percha; then the balance of the canal with oxychloride of zinc. In young teeth it can be forced perhaps into the dental tubuli. It is an antiseptic, and when hard renders the organic matter a fixed material. I object to filling the root entirely with oxy-chloride on account of forcing through the foramen. A great many use a solution of base plate gutta-percha. I recommend a solution of the white gutta-percha, for by experimentation I have found that there is not so much leakage.

Dr. L. A. Faught—For many years I have filled roots of teeth with cotton, and one reason for my so doing is that I have learned the value of such proceeding from both ends of the instrument. I have been a patient as well as an operator. That such fillings are as satisfactory as any others is beyond question. I have in my mouth a lower molar which has been root-filled with cotton for seventeen years, and I have yet to have the least trouble with it. If all the roots I treat give no trouble in half that time, I shall be satisfied with my results as an operator. In answer to the question:

"Why do we want to remove the filling?" I would say that if when trouble arises the patient returns to us, we can, by reference to our records, recall what has been done, and if such reference shows that what was previously accomplished was as thoroughly done as possible, then we do not want to take the filling out. Many patients, however, do not return to us, but they drift to others, or possibly when they seek us we are absent from the office, and relief is sought elsewhere. It is in such cases that—not knowing how thoroughly the treatment was originally—the operator removes the root filling so that he may be sure to place the tooth in good condition for the future. If the canal has been filled with cotton he can do the work with ease and give comfort to the suffering patient.

Dr. Alonzo C. Boice-Is not the whole object to prevent any leakage through the apex? The question then is what is the best method? I cannot succeed with gold, gutta-percha, nor sulphate of zinc. I find it impossible to pack them in the canals. If you take a little cotton and pass it to the end of the root it stays there, and if the canal is dry it is all right. I lately had the privilege of taking a cotton filling out of an old root of a first bi-cuspid tooth. It was sealed in with gutta-percha, the cotton being packed the length of an inch. It was in twenty-five years, and was as sweet as you could wish. It was first filled with gold, then amalgam, and finally patched up and a crown put on. In the discussion we all acknowledge that the canal must be thoroughly cleansed. If it is thoroughly prepared and dried, and you put a filling in the end of that root, will there be any trouble? I have had more success with cotton than with any other material, although I do not always have success with it. I have taken out fillings of gold that were not very pleasant.

Dr. Bonwill—During eight years of my earlier practice, I filled with nothing but gold and tinfoil. Sometimes I had an abscess, and I know the reason, the nerve was not thoroughly extirpated. In some small cavities it is impossible to introduce a broach, and at that time it was difficult to get a good one, as little was known about them. My knowledge of inflammation led me to experiment—to thoroughly extirpate the pulp and leave the cavity open. Many roots which have not been sterilized have given no trouble. I found that whether the pulp was treated with arsenic or not, it made but little difference, the secret of success being in the extirpation of the pulp, and when this was done it did not matter whether you filled the pulp chamber and canals or not.

After a little judgment, and some practice and experience, I commenced to experiment with cotton. The early experiments of Pasteur sufficiently justified anyone in such treatment. He took two pans of milk—one with cotton over it and one without. That which had the cotton over it would stand for days and weeks without any change. That which had nothing over it, and came in direct contact with air was soon changed. Another thing I know, cotton can be worked as thoroughly—can be packed so solidly that you cannot get moisture into it. Knowing the difficulty I had in a great many small cavities of getting gold and tin to the apical portion of the canal, and the occasional trouble I have had with them afterwards, it led me to go into the treatment with cotton, there being no trouble in packing a fibre of cotton. With it I have saved without abscess ninety-five per cent. of the cases that have come to me. It has done for me what I am perfectly satisfied I could not have done with any other material. You cannot pack outta-percha nor get the chloroform mixture there except in a large canal. When it becomes necessary to open into any canal filled with cotton you will find it an easy operation. If filled with gold, as soon as you put the dental-engine upon it and heat it up, it will throw out gas, showing that the tooth substance has absorbed gases. Cotton cannot do any more. I can recall many instances where I put in cotton many years ago, and it has never given any trouble.

Dr. Bennett—Dr. Flagg, speaking of pain about devitalized teeth, calls the peridental membrane the "seat of war," and I think the same term may be not inaptly applied to root canals, as a theme for discussion. And the war still goes on apparently as far from the end as ever. But we have made progress recently as to cleansing and treatment of canals, which are after all the essentials of success. Little has been said about the sources of our knowledge, experimentation, and experience. There is always a difference in tests made in the tooth and in substances of a different nature. I have tested in glass tubes, and I cannot say I would depend as much on such tests as on those made in the teeth. The experiment shown by the essayist does not resemble a filling in a canal, but the method suggested by Prof. Patterson is something to the purpose. You can depend on a test like that every time.

If a man is successful with any method he is entitled to be heard. But then what is success? It certainly has degrees, while failure is something more definite. As to root filling, I do not think that cotton is bad under all circumstances. I would not,

however, call it filling, but treatment continued, for do not its advocates depend on it as a "line of retreat?" And have not these same men the most to say about "retreating?" Some generals as well as operators lay more stress upon such a "line," and seem to need it more than others. The operator who fills the canals with copper amalgam must feel sure of his ground, for this, above all things, is not a "serial" filling.

I have had cases of very bad teeth that I did not venture to fill for a long time, but kept the canals full of cotton saturated with bi-chloride of mercury and iodoform. In such cases, however, it is the *medicine* and not the *cotton* that is depended on. Iodoform is the most persistent and permanent of medicines, and is therefore the best to counteract a persistent septic condition. Nearly all other medicines disappear in such cases as I referred to, odor and all, and that, too, no matter how perfectly the canal was cleansed or how well it was corked at both ends.

But filling is only one thing, and not the most difficult or important. Cleansing the canal and disinfecting or desiccating the tubuli and closing the foramen are the first three essential steps to successful treatment. If a canal must be enlarged, and I for one often find this necessary, first dry it thoroughly with hot air, so that no septic fluid be forced through. Begin with the larger drills, Morey or Gates-Glidden, and proceed gradually to the small ones. For the rest, poison and burn out the germs and gases. These, not the filling, are the points that count.

As to filling, I regard cotton at one extreme and gold at the other. Both are primitive materials. Cotton is easily applied and not conducive to cleanly and careful work; gold is simply a stopping, and requires skill for its insertion. Of the other two materials, guttapercha and oxy-chloride of zinc, they are the best adapted to the greatest number of cases and operators. Gutta-percha, like gold, is merely a stopping; but when it is forced through, it is, unlike gold, non-irritating. It has been said that it is permeable by gases but what material is not? Oxy-chloride of zinc is the only material that reacts on the gases, or that has any effect on the organic portion of the dentine.

Dr. H. C. Register—If I understand the purport of the paper it embraces the filling of pulpless teeth under all conditions. The discussion, to my mind, refers only to the immediate filling of canals when the pulp is destroyed and removed by intent. Under such conditions I can understand how cotton can be judiciously and successfully used. If, however, the subject embraces all classes

of pulpless teeth, then I think Dr. Truman takes decidedly the proper stand. To make a sweeping assertion that the cotton treatment covers these numerous conditions of pulpless teeth is to admit either ignorance or indifference on the part of the operator. If the pulp is taken away what is the object of filling the chamber? There must be some reason for it, and now let us see if we can, in our imperfect way, throw some light upon the subject.

A tooth that has its pulp destroyed by intent, retains its dentine basic substance etc., all in normal condition, less the fibrillæ, which had their origin in the pulp, and die with the source from which they received their nourishment. No degenerate action further than devitalization having taking place, it is but necessary to remove the pulp, and render the adjacent parts in condition beyond contagion of a ferment, or the sequence of bacterial action; and to this end I can understand how cotton judiciously impacted can remain pure and protect the parts for an indefinite number of years.

If however, we leave this class of devitalized teeth for those that have passed into a putrescent state, of greater or less duration of time, we have a very different condition upon which to operate. The dentine we find is composed of about twenty-four (24) parts of organic matter, the pulp a highly organized body of organic matter only; and the death of these tissues of long standing may be divided into two classes. The one opened from the onset to the atmospheric influences, the other hermetically sealed within the long chamber. In the latter case we have degenerate matter only -broken down tissue; while in the former we have in addition to that condition of things, all the complications of micro-organisms added to it. It is these two classes of conditions that give the greatest trouble in sealing up the canals. The dentine in either case has passed from a normal condition. In the case of the open cavity, we have the basis substance, in many cases, permeated by the conditions found in ordinary caries; the tubulated structure encroached upon, oft-times the whole length of the tubuli being filled with fungus bacterial growth, in addition to inroads made into the basis substance itself; and the whole mass more or less a tooth garden of new life flourishing upon the inanimate tissue that is passing into waste. In the case where the tooth is sealed from external action, and the pulp devitalized, we have degenerate tissue only. But open these chambers to atmospheric and salivary action, and it will require but a few hours to place them in the same condition in which we find the cases just quoted. With these conditions it becomes necessary in the one case to remove the maximum amount of degenerate matter, and insure its inertness, and destroy all morbid growths found within the organ. before the canal can be filled with safety. In the latter case it is necessary only to render the degenerate tissue inert, and prevent micro-organisms from gaining a lodgement therein. Now when we focalize the object in view in the treatment of these cases, it confines itself to placing the dentine in a condition of non-activity, or otherwise suspending the action of any influence that can become an irritant. To this end do we resort to antiseptics and germicides.

The greater or less length of time, in my judgement, has little to do with its success. The agent that will suspend or control all degenerate action has everything to do with the success, whether it requires minutes, hours or days. From clinical observance, general practice and theoretical investigation, this course of treatment holds good. When the pulp is destroyed by intent and carefully removed, the dentine thoroughly desiccated, and the chamber walls coated with some germicidal agent, the tooth may be successfully filled and the pulp chamber left vacant; or, the chamber may be filled with any material that will hermetically seal it. The two latter conditions, which are typically alike, require the dentinal territory to be thoroughly robbed of its resident moisture, rendering it sponge-like, which can be done by forcing into it through a system of compressed air, heated as hot as the patient can bear it, and carried to the most distant parts of the canals by platinum hair tubes, and followed, while in a condition of thorough dryness, with a germicidal agent that will permeate it to its peripheral surface, rendering the whole territory inert. The cavity may be filled with gold saturated with oxy-chloride of zinc, or any material which will hermetically seal it. Copper amalgam, into which is rubbed a small quantity of the following dressing, has, in my hands, given me the most satisfaction.

R.	Oil Pepper	rmint		 						 ٠			٠.			.3j
	Iodoform				 									1	5.5	700
	Glycerine	Starch.			 									3	21.21	588

The dressing is easily carried upon a broach. The vegetable starchy matter, being in such small quantity, does not decompose, and makes it of a pleasant consistency for use. The oil of peppermint in combination with the iodoform is far-reaching and lasting.

Dr. Tees—For many years it has been my practice in filling single-rooted teeth easy of access, to pack a pledget of cotton saturated with carbolic acid in the apical portion of the canal and

fill the remainder of the canal and pulp cavity with gutta-percha. In teeth of more than one root, I have been content to fill the opening of each canal with a pledget of cotton saturated with carbolic acid and filling the pulp cavity with gutta-percha. When this has been carefully done, and has been expedient in after years to remove it, the cotton has not been found offensive to the smell. I think it is well that the leading men of the profession are giving up gold as a canal filling. I regard oxy-chloride of zinc as an excellent filling for that purpose, and I endorse Dr. Truman's treatment so far, preferring, however, the placing of the cotton and carbolic acid in the apical portion of the canal.

Dr. Dean—I would like to ask Dr. Register if he cleans out the root of all its dead material?

Dr. Register—I strongly advocate cleansing out all the tissue from the root canal. At the same time I think the success is largely due to cleansing the mouths of the tubuli, and at the same time preventing any entrance of micro-germs. I think the success is in cleansing out the canal and preventing any degenerate condition.

Dr. Head—I would like to reply to Dr. Truman in relation to gutta-percha. He said that gutta-percha has a good record for preserving tooth structure. This I do not deny, but still affirm that it absorbs fluids and that, therefore, is an imperfect canal filling. Dr. Patterson's objection to my test in the glass tube is, of course, perfectly legitimate; but I think this test has been carried out more accurately than he supposes. Some years ago I came upon a tooth that had been thoroughly treated and thoroughly filled with gutta-percha to the end of the canal. There was an alveolar abscess, but the gutta-percha was permeated from apex to pulp cavity with gas. But in all this discussion no one has answered any of my questions. I will ask Dr. Truman, does not gutta-percha leak?

Dr. Truman—I do not think so.

Dr. Head—I leave his answer with you. Dr. Truman, does not oxy-chloride of zinc absorb fluid?

Dr. Iruman—It does.

Dr. Head—Then, if oxy-chloride of zinc absorbs fluids, how can this material protect a sterilized canal from putrefactive germs? How can it possibly be called a perfect filling?

Dr. Kirk—The method described by Dr. Head of filling root canals with cotton, armed with carbolized cosmoline, is, in my judgment, not in any sense an argument in favor of cotton as a root filling, but one in favor of cosmoline. The cotton is merely incidental, in the same way that it is often used in connection with

oxy-chloride of zinc, viz.: as a vehicle for carrying to place the real filling material, which is the cement. Cosmoline is a heavy hydro-earbon oil, totally unalterable in air or moisture by virtue of its non-affinity for oxygen. It is sufficiently viscid to remain in the canal almost without the help of the cotton, which, in its relation to the cosmoline, fulfills the same function as the old root filling of gold saturated with gutta-percha solution.

In its general characteristics, a root filling of cosmoline and cotton would be very similar to that of parafline, which is exceedingly valuable, and can be pumped in a melted state into the finest canal—with the advantage that when it is chilled and solidified it is denser. Subject passed.

SPECIAL MEETING OF THE PHILADELPHIA COUNTY DENTAL SOCIETY.

HELD AT EARLY'S HALL, WEDNESDAY EVENING, MARCH 27, 1889.

President Frank Basset in the chair.

The President announced a paper entitled:

A STUDY OF ARSENIOUS ACID.

BY L. ASHLEY FAUGHT, D. D. S., PHILADELPHIA.

Dentistry involving largely a routine mechanical service, its practitioners too often neglect to be thoroughly conversant with the drugs they use. What acquaintance is made with materia medica should be at least sufficiently extended to insure not only safety in use, but ability to cope with the accidental condition of misuse. Not a few of the medicaments employed by dentists are of a poisonous nature, and that to a degree requiring most accurate care in their exhibition; and most prompt and efficient antidotal treatment in case of injurious action. Perhaps none in this respect demands more careful study than arsenious acid. I invite your attention for a few moments this evening to a definite consideration of the aspects of it, which have heretofore been omitted, or but intimated in a very general manner.

"According to the preparation of the arsenic, and the size of the dose, and the manner of its employment, it is either tonic, antiperiodic, pulmonic, detergent, escharotic, or a *vital* irritant (poison)." It is ordinarily used in dentistry for pulp devitalization,

¹ Dental Cosmos, vol. XIX, p. 227. Flagg.

and for such purpose has been variously combined in mechanical mixture with other materials. The best formula is the old original one:

 R. Acid arsen
 gr. v

 Morph. acet
 gr. x

 Creosotum vel. ac. carbol
 gr. x

I have never found the other formulæ, subsequently suggested, to possess any additional qualities, of which I did not have the benefit in the one mentioned; while I have, in many, suspicioned the engraftment of undersirable features.

It is not my intention to give my fellow-practitioners instructions in the proper use of arsenious acid; for, if any are in need of lessons, the pages of our text-books are adequate, and to them they are respectfully referred. The province of this paper is to record a few facts gathered from experience, so that any seeking information may not in the future search the professional literature for them in vain, as I have done.

In the first place I desire to suggest that accuracy be used in referring to the drug, naming it as arsenious acid, and not as arsenic, which is so frequently done, for it is an oxide of arsenic, $As_2^{\circ}O_3$; also, that as arsenious acid is poisonous in the highest degree, it is well for everyone using it about the mouth, to acquaint himself with the bulk of the usual safe dose, when internally administered. This amount is the $\frac{1}{20}$ of a grain, safety existing between the $\frac{1}{60}$ and $\frac{1}{12}$ of a grain, according to the susceptibility or idiosyncrasy of the patient.

Knowing this quantity definitely, it is positive that systemic trouble cannot supervene, either through local absorption, or in the event of the dressing becoming dislodged and swallowed; for "the quantity of arsenious acid to be employed for devitalization will depend upon the structure and class of the tooth, varying from the $\frac{1}{25}$ to the $\frac{1}{20}$ of a grain."

Reference is here made to these points at the risk of being thought over precise, because it is my belief, sustained by observation, that from our constant contact with the drug there is too often a tendency to carelessness in its use.

So much for the drug itself; I now desire to speak of ways by which arsenious acid is unintentionally introduced into the mouth, and followed not infrequently by pathological conditions.

¹ Gorgas' Dental Me licine, p. 130.

The first of these is by uncleanly instrumentation. Care should be taken that the napkin, instruments, vessel containing the medicament, etc., used in making an application, are thoroughly separated from all others, and from contact with the operating tray until cleansed of every trace of the preparation.

I have seen many cases of arsenical ulceration occurring in the mouths of patients in which no arsenious acid had been used; and which were due in all probabilty to the use of instruments that had previously been employed in connection with arsenious acid in another mouth, and returned to the operating case without thorough cleansing; or to the use of instruments, that by virtue of their character, were supposed to have no possible connection with arsenious acid, but to which the drug had been transferred from contact with others contaminated, or with the spot on the tray on which they had rested.

The second way is by the use of rubber dam. Some nine months ago I had an experience in this direction. Quite a number of my patients complained, in immediate succession, of sore mouths. Examination revealed the puzzling condition of unmistakable arsenical ulceration, when I knew that my arsenious acid had not been out of the medicine case for a month.

Recognizing, from previous experience and from the fact that the diseased condition existed only in mouths in which I had been operating with rubber dam, that the cause was the dam, I made application of it to a mouth and produced similar symptoms. The discontinuance of further use of that piece of rubber dam was followed by a cessation of the trouble. I now pemanently ceased to use that make of dam, and fixed for the future upon the product of another standard house.

For nine months I have enjoyed immunity, but within the last week the trouble has recurred. From these and like occurences in past years, the conclusion is drawn that no make of dam can be relied upon, as absolutely safe from arsenical taint, and that ulceration may follow its use at any time when circumstances combine to bring together, a piece so infected (through some irrregularity in its manufacture,) and a susceptible mouth. It is, therefore, to be earnestly recommended that each piece be thoroughly washed with soap and water, before application.

All that is here written, I am well aware, is opposed by the manufacturers of rubber dam, who make an emphatic denial, and say that preparations of arsenic are never used in its production.

As, however, my clinical evidence is indisputable, they certainly must be in error, or the arsenic is unintentionally introduced by contaminate combination with the chemicals used, such as sulphur, soapstone, etc. The latter may possibly be contaminated by the arsenite of calcium, while sulphur is so frequently contaminated by arsenic, that the greatest possibility exists of such introduction by this means.

The third method of accidental introduction occurs through a combination of conditions. I have met more than one with arsenical ulcerations, due to the escape of the medicament upon the removal of old plugs from teeth, in which the pulps had been devitalized at the time of their insertion. In these cases it is evident that the previous operator failed to remove all traces of arsenious acid before dressing and filling the tooth, and it had remained there inert for many years.

The fourth way is through perforations. Teeth have been tapped to relieve the symptoms of incipient abscess which were due to death of the pulp in but one canal of the tooth, and tapped too far, producing an unrecognized perforation. Arsenious acid has then been applied in what was supposed to be a closed cavity—to destroy the vitality of the remaining portion of the pulp, and has escaped through the perforation.

The last way to which I shall refer in this connection is that with which the dental profession is most familiar—the escape of the drug application, by the use of unsuitable coverings to secure it. Writing on the subject of the drug, Dr. Louis Jack says: "Cotton with which wax has been combined, as recommended by Dr. Maynard, cotton partially saturated with sandarach varnish, and guttapercha are each admirable when the circumstances permit."1 Prof. James Truman writes, "cover this with a lead cap, and then fill the balance of the cavity with gutta-percha."2 Notwithstanding the wholesale condemnation which is so frequently made of the use of cotton saturated with sandarach, your essayist has found that his experience agrees with that of Dr. Jack; but he also disagrees with him, with Dr. Truman, and with all others advocating the use of gutta-percha. My experience has been that it is more or less leaky, so that I prefer cement, Dr. Gilbert's temporary stopping, or some similiar preparation.

The influence of arsenious acid, when introduced into the mouth so that it comes in contact with the mucous membrane, is as insidious

American System of Dentistry. Vol. II, p. 173.

² American System of Dentistry. Vol. I, p. 902.

as it is destructive. At the moment of escape there is no evidence of the fact. The local effects becoming manifested in from twenty-four to forty-eight hours. There being no pain the destruction of tissues is well progressed before the case comes to the operator's notice. The diseased membrane then presents diagnostic points varying with the interval which has elapsed between the escape of the drug, and the commencment of treatment. If seen early, the membrane has an appearance somewhat as though it had been scratched with a sharp instrument, the wound being red like a piece of raw beef, while the edges and membrane surrounding show simply deepening of the natural color of the gum- a congested condition. At a later period the veins in the surrounding tissues may become prominently developed. If they do not share in the congestion to this extent, the trouble will be of short duration. At the expiration of four days the wounds have the appearance of true ulcers—a deep depressed centre with raised edges—and while not increasing markedly in area, do increase in depth. The action of arsenious acid seeming to destroy, in the first attacked area, by dropping to the bottom of the wound, thus keeping in constant contact with fresh tissue.

Our attention is usually called to arsenical ulcerations by the patient complaining in a similiar strain to this: "My gums feel a little tender since the last operation—they hurt a little in brushing the teeth." They do not complain of pain unless the arsenious acid has access to the periosteum. The pain then is severely acute, with all the symptons of periostitis very much aggravated

The differential diagnosis between arsenical ulceration and rodent ulcers most commonly found in the mouth is not difficult. In the first place, rodent ulcers are generally situated on the soft tissues, inside of the lips, or near the fræmun of the tongue; while arsenical ulcerations have no definite location, may occur any where in the mouth, but are especially prone to be located upon the gums. Then, again, they differ markedly as to appearance. Rodent ulcers are apt to be large and quite painful, while arsenical ulcers are irregular in shape, and like a scratch. Rodent ulcers have a white base, while arsenical ulcers are red, look like raw beef, and are not painful to the touch. With these marked points of difference in appearance, none need err in making a correct diagnosis.

TREATMENT.—Wherever practical, the soft tissues should be curetted,—searify freely, wash away the blood and shreded membrane with warm water, and then touch the wound with muriate

tincture of iron, or cover with magnesia (Husband's). Then cauterize the wound with carbolic acid, or apply tincture of iodine, and if needed stimulate further in a few days by another application of the last used, "remembering that if we produce inflammation of a part, we check its absorptive power." The attack is usually fully ended in about ten days, and where the treatment here indicated is promptly and thoroughly used, I have never seen the patient much inconvenienced, or the tissue much destroyed;—in other words, no untoward results have followed.

DISCUSSION ON DR. FAUGHT'S PAPER.

Dr. A. B. Harrower, Philadelphia—Said that he had only one case of arsenical poisoning through escaping arsenious acid. Did not want another. By mixing the acid with cosmoline the action of the drug was materially slowed. He advised a combination of sulphate of atropia, 1 gr., arsenious acid, 2 grs., and lanoline, 10 parts. He had used such a preparation for the past eighteen months, treating forty-eight cases without any pain. In two instances there had been pain.

Dr. S. J. Dickey, Philadelphia—Had had but a limited experience in the use of the drug, has had no trouble, does not believe in its use, depends rather upon careful cleaning and capping.

Dr. H. Townsand, Philadelphia—Thought that the sandarach varnish was, in many instances, the cause of the pain. Had had no trouble with ulcerations in the mouth, did not think there need be any if care is used in the application of the drug.

Dr. Alonzo Boice, Philadelphia—Never makes an application until he has thoroughly cleansed the cavity, consequently never has any trouble of drug escaping through perforation; uses the smallest quantity possible— $\frac{1}{500}$ of a grain—which, if it did come in contact with the tissues of the mouth, could do no harm, used freshly ground arsenious acid (Hubbard's), and applied on a very fine probe by puncture. In this manner of using it did not matter much what stopping was used. For his part, generally used cotton saturated with sandarach varnish. Had never had any trouble.

Dr. C. M. Dixon, Philadelphia—Probably used more arsenious acid than any one in the city, because his practice ran that way. Had had only one case that gave him any trouble. It was a superior lateral incisor. Had made a second application, requesting patient to return on the second day. She did not do so,

¹ Farquharson's Therapeutics and Materia Medica, p. 152.

but removed the stopping herself, and when next seen had a terribly swollen lip. Treatment consisted in drying lip thoroughly and applying tincture iodine, full strength. Continued treatment daily for four days, when trouble was cured. Had never had any trouble with rubber dam; always washed thoroughly before using. He makes application by touching a small pledget of cotton which had previously been saturated in creosote in dry acid and putting directly on pulp, uses dry cotton to stop with.

Dr. Chas. E. Hopkins, Philadelphia—Always cleans the tooth thoroughly and applies on small probe, does not use cotton to make, application, uses Dr. Gilberts stopping to seal cavity.

Dr. Otto E. Inglis, Philadelphia—Had had one case of poisoning where application had been made two years previously. It was a bad case and considerable exfoliation occurred necessitating the removal of a sequestrum.

Dr. Frank Bassett, Philadelphia—Had seen one case where the process between two molar teeth was destroyed. Always uses as small a quantity as possible, in solutions and stopped with guttapercha, was afraid sandarach varnish would come out.

In regard to pain following application had never found anything that would satisfactorily control it.

Dr. Faught said, in closing that he was somewhat disappointed in the turn the discussion had taken; the paper did not treat of the methods used in applying arsenical applications, but dealt with the question of its misuse, did not think that he was more careless than others in the use of the drug but rather more alert to discover ulceration caused by it. Several bad experiences in early practice had led him to keep a lookout for symptoms indicating trouble, as it was much easier to anticipate trouble than to treat a bad case of ulceration or necrosis. Subject passed.

Editorial.

DENTAL COMMENCEMENTS.

Another college year has ended, and a large number of dental graduates have been cast upon their own resources, some to succeed, some to fail. Many will find that the time spent has been too short fully to prepare them for the manifold duties, which will only too rapidly devolve upon them; and in their perplexity they will wish that they had spent another year, aye, two, at their alma mater. The question is often asked in the East, where do all the dental graduates go? When the boundless possibilities of the West, with its rapidly growing population are considered, it does not take a wiseacre to say West. But not all go West; many remain at home to take the places of their preceptors, who on account of age or failing health, are intending to retire from practice, and the young graduate by reason of his better qualifications finds little difficulty in holding the practice. When it is taken into consideration that the estimated number of dentists in practice who hold degrees is not more than ten or fifteen per cent. of the entire body, it is easy to see that it will be many years before there will be a genuine glut in the profession, and when really good men, fully qualified for practice, will experience trouble in finding a place where they can earn a good living; especially as the standard for graduation is being raised, and the doors barred against the entrance of illiterate and ill-prepared men into the profession. Let the good work go on. There is always room at the top, and we welcome the boys into the ranks.

We acknowledge the receipt of programmes and lists of graduates from the following institutions:

The Third Annual Commencement of the American College of Dental Surgery was held on Monday, March 25, 1889, in Chicago, Ill. The doctorate address was by C. T. Hood, A. M., M. D., and the valedictory by J. A. Whipple, D. D. S. Degrees were conferred by the President, L. D. McIntosh, M. D., D. D. S., upon twenty candidates, out of a class numbering — matriculates. The senior class represented five different states. Increase of matriculates over 1888 —. Per cent. of graduates to matriculates for 1889, —, for 1888, 18; average for two years, —.

The Baltimore College of Dental Surgery held its 49th Annual Commencement in the Lyceum Theatre, March 15, 1889. The music was by Prof. Adam Itzell's orchestra, and we notice the

innovation of dividing the graduating class, which numbered 44, into small groups of seven members each, for the conferring of degrees, and having a short selection played by the orchestra while each group was retiring. The annual oration was delivered by the Rev. J. U. McCormick, and the valedictory by C. L. Morey, D.D.S., Texas. Twenty-four countries, states, and territories were represented in the graduating class. Matriculates, 118. Graduates, 44. Increase of matriculates over 1889 was 4. Per cent. of graduates to matriculates for 1889 was 37. For 1888, 46. Average for two years, 41.

The Chicago College of Dental Surgery held its seventh annual commencement at the Grand Opera House, Tuesday, March 26, 1889. The faculty address was made by Prof. Geo. H. Cushing, M.D., D.D.S., and the valedictory by Benjamin Eshelman, D.D.S., Iowa. Truman W. Brophy, M.D., D.D.S., Pres., conferred the degree of D.D.S. upon sixty-four graduates. An honorary degree was conferred upon James Atwood Swasey, Chicago. The number of matriculates was 154; graduates, 64; representing ten different countries, states and territories—29 being from Illinois.

Increase of matriculates over 1888, 18. Per cent. of graduates to matriculates for 1889, 41; for 1888, 34; average, 37.

The Indiana Dental College held its tenth annual commencement Wednesday, March 6th, at 8 P. M., at Association Hall, Indianapolis. Addresses were made by Dr. John Chambers and Prof. Coulter, of Wabash College. Degrees were conferred upon 17 aspirants. Matriculates for the year, 51; with nine different states represented in the graduating class.

Increase of matriculates over 1888, 21. Per cent. of graduates to matriculates for 1889, 33; for 1888, 54; average for two years, 43.

The Eighth annual commencement of the Kansas City Dental College was held Monday, March 11th, 1889, 8 o'clock P. M., Music Hall, Broadway, Kansas City, Mo.

Addresses on behalf of the faculty by C. B. Hewitt, D.D.S. Conferring of degrees and award of prizes by E. W. Schauffler, President of Faculty.

Matriculates, 30; graduates, 11—representing five countries and States.

Increase of matriculates over 1888, 7. Per cent. of graduates to matriculates for 1889, 36. For 1888, 35. Average for two years, 35.

The Twenty-third annual commencement of the Missouri Dental College occurred at Memorial Hall, St. Louis, Missouri, March

14th, 1889. Prof. Henry Mudd, Dean, conferring the degree of Doctor of Dental Surgery upon eighteen aspirants for dental honors. The honorary degree was given Chas. R. E. Koch, Chicago, Ill. Number of matriculates fifty-four. The graduating class represented four States and Territories and two fareign countries.

Increase of matriculates over 1888, 19. Per cent. of graduates to matriculates for 1889, 38. For 1888, 37. Average for two years, 35.

The New York College of Dentistry held its twenty-third commencement at Chickering Hall, New York City, Monday evening, March 4, 1889. The valedictory address was given by Dr. John Charles Oberle, D.D.S., of New York.

Number of matriculates for session, 245; graduates, 69; representing twenty-six counties and States, with 19 foreigners.

Increase of matriculates over 1888, 34. Per cent. of graduates to matriculates for 1889, 25. For 1888, 3; average for two years, 29.

The Forty-third annual commencement of the Ohio College of Dental Surgery was held on Monday, March 4, 1889, at College Hall, Cincinnati. E. D. Warfield, Esq., delivered the annual address, and H. M. Patton, D.D.S., the valedictory for the class.

C. R. Taft, Vice-President of the Board of Trustees, confirmed degrees upon 65 applicants, representing 15 different States; 33, however, being from Ohio. The whole number of matriculates was 150—an increase of 36 over 1888. Per cent. of graduates to matriculates for 1889, 43; for 1888, 26. Average for two years, 36.

The Thirty-third annual commencement exercises of the Pennsylvania College of Dental Surgery took place at the Academy of Music, Philadelphia, March 1, 1889. An address was delivered by Prof. Henry Leffman, D.D.S. The degrees were conferred by President S. W. Gross, since deceased. Full number of matriculates for session, 178. The graduating class were attired in full-dress suits and numbered 91. Increase of matriculates over 1888, 18. Per cent. of graduates to matriculates for 1889, 51; for 1888, 36. Average for two years, 43. We are informed, however, that this number included four names that had been in attendance three years, so that the regular class numbered 87.

The Philadelphia Dental College held its Twenty-sixth annual commencement exercises at the Academy of Music on the evening of February 28, 1889. This institution has adopted caps and gowns, which made a very pretty effect. The annual address was delivered by Prof. S. B. Howell, M.D., D.D.S., and the valedictory by James G.

Whiting, D.D.S. The degrees were confirmed by ex-Governor Pollock, President of the Board of Trustees. Matriculates for the session, 226. Graduates, 98, representing 29 different countries and States, with 23 foreign, of whom 14 were from Canada. Increase of matriculates over 1888, 13. Per cent. of graduates to matriculates for 1889, 43; for 1888, 54. Average for two years, 49.

The Second annual commencement of the Dental Department of the Columbian University was held at Washington, D. C., March 21, 1889, being held in the Albaugh Opera House.

Prof. Henry C. Thompson, D.D.S., delivered the address to the class which numbered fourteen, and presented three members for graduation representing two different States. Increase of matriculates over 1888,—. Per cent. of graduates to matriculates for 1889, 21; for 1888,—. Average for two years,—.

The Dental Department of Howard University held its Second annual commencement in the Congregational Church, Washington, D. C., March 16, 1889. Robert Rayburn made the address to the class, and Hamilton Smith delivered the valedictory.

Matriculates for the session, 11. Graduates, 6, representing four different States. Decrease of matriculates since 1888,9. Per cent. of graduates to matriculates for 1889, 55. For 1888, 40. Average for two years, 47.

The Seventh annual commencement exercises of the Dental Department of the University of Iowa were held at the Opera House, Iowa City, March 4, 1889. Hon. Albert Swaine gave the address to the students. The degree of D.D.S., was conferred upon twenty-one aspirants for dental honors by Chas H. Schaeffer, President of the University. Number of matriculates for session 79. The senior class representing six different States. Quorum of matriculates over 1888, 29; per cent. of graduates to matriculates for 1889, 26. For 1888, 40. Average for two years, 38.

The Seventh annual commencement exercises of the Department of Dental Surgery of the University of Maryland took place Wednesday, March 13, 1889, at the Lyceum Theatre, Baltimore, Md., Prof. F. J. S. Gorgar read the mandamus, Dr. J. B. Patrick gave the address to the class, and Hampton K. Smith, D.D.S., delivered the valedictory. Degrees were conferred by Hon. S. Teakle Wallis, LL.D., Provost of the University, upon thirty-nine members of the class, which numbered one hundred and twenty for the session.

The graduating class represented twenty different countries and States. Increase of matriculates over 1888, 11. Per cent. of graduates to matriculates for 1889, 32; for 1888, 47; average for two years, 39.

The Dental Department of the University of Tennessee held its Eleventh Annual Commencement in the Masonic Theatre, Nashville, Tenn., on Tuesday, February 26, 1889. The annual address to graduates was made by Prof. W. E. McCambell, A.M., D.D.S., and the valedictory by Rubert D. Crutcher, D.D.S. Matriculates for the session, 22. Graduates upon whom the title of D.D.S. was conferred numbered 13, representing four different states.

Decrease in matriculation since 1888, 6. Per cent. of graduates for 1889, 69; For 1888, 32. Average for two years, 50.

The Annual Commencement excercises of the Dental Department of the St. Louis College of Physicians and Surgeons were held at Memorial Hall, St. Louis, Mo., Friday, March 8, 1889. Degrees were conferred upon six graduates in a class of fourteen representing — different states. Decrease of matriculates since 1888, 4. Per cent. of graduates to matriculates for 1889, 44. For 1888, 39. Average for two years, 41.

The Second Annual Commencement exercises of the Dental Department of the Southern Medical College, Atlanta, Ga., were held in De Give's Opera House, Atlanta, Ga., Saturday, March 2d, 1889. Rev. Dr. Walker was the orator of the occasion. The Valedictory was delivered by A. R. McBoth, D.D.S.

Thomas S. Towell, M.D., President of the Board of Trustees, conferred the degrees upon seventeen members of the class, which numbered thirty-six for the session. The senior class represented seven different countries and states. Decrease of matriculates since 1888, 8. Per cent. of graduates to matriculates for 1889, 47; For 1888, 34. Average for two years, 40.

The Third Annual Commencement exercises of the School of Dentistry of Meharry Medical Department of Central Tennessee College were held in Masonic Hall, Nashville, Tenn., February 21, 1889. The Faculty address was rendered by R. F. Boya, M.D., D.D.S., and the valedictory by James R. Potter, A.B., D.D.S. Degrees were conferred by the President of the Faculty, J. Braden, D.D., upon six candidates, representing four different states. Whole number of matriculatas, 11. Decrease of matriculates over 1888, 1. Per cent. of graduates to matriculates for 1889, 54. For 1888, 16. Average for two years, 35.

The Department of Dentistry of Vanderbilt University held its Tenth Commencement at the Masonic Theater, Nashville, Tenn., February 20th, 1889. The faculty address was delivered by Prof. D. R. Stubblefield, D.D.S., and the valedictory by J. McClark, D.D.S. The degree of D.D.S. was conferred by L. C. Garland, L.L.D.,

Chancellor of the University. Candidates for gradution, 28; matriculates for the session, 95. The senior class represented fourteen diffrent states. Increase of matriculates over 1888, 18; Per cent. of graduates to matriculates for 1889, 29; for 1888, 42; average for two years, 35.

A COMPARISON OF STANDARDS.

From the accompaning table prepared from the annual reports of the short-term colleges of the country we are able to draw a few conclusions as to the relative standard of the several institutions therein enumerated. We have intentionally ommitted the long term colleges on the ground that better opportunity for instruction can be given to the same class of students in a course of two years of seven months each or in a course of three years. In making this statement, we are taking it for granted that the facilities for instruction and the instructors themselves are of equal ability and advantage respectively. We are compelled to do this in the absence of any evidence to the contrary. It is true that an effort was made to formulate a table showing the exact amount of time devoted to each subject and the number of subjects taught in each institution, but which failed to be accomplished by reason of lack of co-operation on the part of the colleges themselves.

There then remains only one basis upon which to draw a comparison of the relative standards of the various dental colleges in the country, and that is on the time-basis and the proportion of graduates turned out to the number of students matriculated. In such an estimate we must necessarily assume that students are of equal ability in all the different colleges. It will not do to credit any one institution with having a "run" of the best students as an excuse for a higher per cent. of graduates to the number of matriculates. Students average about the same. If there is any difference, those who have the least capacity will be found in institutions that have the lowest standard, by reason of the fact that they distrust themselves and seek that institution which has the reputation of giving the "easiest" examinations. We have also in this review of the question taken an average of two years so as not to deal unfairly with any: Circumstances may arise which give an institution a higher per cent. one year than another, but by taking an average of two years we avoid this liability. Yet there may be certain cases in which even this precaution will not be sufficient and we may be dealing unjustly with some of the institutions mentioned.

If such is the case, our columns are open to all and we will gladly give all an opportunity to explain. Our object is to promote thought and discussion, and not to censure any one institution.

If our premise that the students of the several institutions are of equal ability is correct, then the standard of any given institution, every-thing being equal, will be in inverse ratio to the proportion of graduates to the number of matriculants for the same year. If a two year institution sends out fifty per cent. of its matriculates each year, then matriculation in that institution is as good as a guarantee to graduation; the chance a student takes of not getting a diploma being expressed in the difference between the annual number of graduates and one-half of the matriculates.

An examination of the reports shows that the proportion in which the different colleges graduate students, varies considerably, from twenty-nine per cent. to fifty per cent. Let us put forty-three per cent. as a healthy standard, and we shall find that out of the nineteen colleges enumerated sixteen of the number fall within the standard mentioned, while three run higher. Of the six hundred and sixteen graduates for the session of '88-'89, four hundred and ninety-nine are from colleges, no one of which has passed more than forty-three per cent. of their matriculated number, while the average for these institutions is thirty-seven per cent. of the matriculation list. The other one hundred and seventeen graduates are from three institutions, in which the average per cent. of graduates is forty-eight and two-thirds per cent. of matriculates for two years.

The above should make interesting reading to the members of the State Boards of Dental Examiners, and perhaps save them some lengthy calculations. It is essential that they sooner or later take cognizance of the facts therein contained. It lies with them to regulate the standard for admission into practice and to pass on the standing of dental diplomas. In making these comparisons, we have been without bias and have presented the facts as they appear in the published reports of the several institutions. It is argued by some that our Colleges are private institutions, to be run as best suits the wishes and ideas of their board of trustees, who are generally members of the faculty also, and that they are not subject to inspection by the public.

We hold, however, to the contrary, and say that neither Dental nor medical colleges are private institutions, so long as their diplomas carry with them the license to practice. If a diploma represented the standard of education in any given institution only, and the

Condensed list of eighteen short term colleges, showing number of matriculates and graduates for 1888.9; also the per cent. of graduatem to matriculates for 1883-9, the per cent. for 1888, and the average for two years. We should have been glad to make the list more complete, but were unable to get data from the other colleges, although we sent a request.

	Matriculates.	Graduates. 1889.	Per cent. 1889.	Per cent. 1888.	Average for two years.
Baltimore College of Dental Surgery, Baltimore	118	44	37	46	41
Chicago College of Dental Surgery, Chicago	154	64	41	34	5.50
Indiana Dental College, Indianapolis.	51	17	33	202	85
Kansas ('ity Dental College, Kansas City.	30	11	36	35	35
Missouri Dental College, St. Louis.	54	18	33	37	35
New York College of Dentistry, New York City.	245	69	25	34	. 29
Ohio College of Dental Surgery, Cincinnati	150	65	43	29	98
Pennsylvania College of Dental Surgery, Philadelphia	178	91	51	98	45
Philadelphia Dental College, Philadelphia.	228	98	43	7-9	. 49
Columbian University. Dental Department, Washington, D. C.		හ	21	*	*
Howard University, Dental Department, Washington, D. C	11	æ	55	40	. 47
University of Iowa, Dental Department, Iowa City	19	21	26	40	80
University of Maryland, Dental Department, Baltimore	120	39	67 SS	14	39
University of Tennessee, Dental Department, Nashville	22	13	69		. 50
St. Louis C're of Physicians and Surgeons, Den'l Den't, St. Louis	14	9	++	68	41
Southern Medical College, Dental Department, Atlanta, Ga.,	36	11	47	34	40
School of Dentistry Central Tennessee College, Nashville, Tenn.	11	9	54	. 16	35
Vanderbilt University, Department of Dentistry, Nashville, Tenn.	95	288	56	42	35
9	1610	616	30 30	55	37.5

* Unable to obtain figures.

license to practice was vested in and to be obtained only through a board appointed by each State for that purpose, then our colleges would not be accountable to the public in so great a measure for the way in which they manage their property. Such however is not the case.

A diploma should represent the standard of education in the institution granting it, be it scientific or literary, and no more. This rule seems to us to be more imperative in medicine and dentistry than in other profesions; with the former health and even life is at stake, yet the greatest liberty is given institutions to grant diplomas which, in many instances, carry with them the license to tamper with the public weal in a manner which is terrible to contemplate. Some decided restrictions should be thrown about the practice of those callings that have to do with the general good, and we are happy to see that such is the tendency of the times.

Let the subject be fully discussed with the view of establishing a more equitable basis upon which to judge of the character of instruction furnished. We greatly doubt whether it will ever be possible or even desirable to make the instruction alike in all institutions; it should, however, be under the control of boards appointed by the several states, and in order to give them power, the licensing power should lie with them, and not in the college which grants the diploma.

LOOKING AHEAD.

Now that the regular college year has ended in most of our institutions, and the less arduous duties of the spring course are on hand, we desire to call the attention of the several dental faculties which send representatives to the National Association of Dental Faculties, to two resolutions that were passed at its last session regarding the proposed lengthening of the college term and the requirements for a seat and voice in the coming session of the association to be held at Saratoga, in August next. At the last meeting a motion was offered by Dr. Brophy and carried by the association, to the effect that "hereafter a delegate representing a college of the association shall be a member of the teaching faculty of such college, and shall present properly executed credentials specifying his authority to represent his college, before he shall be allowed to vote on questions before the association."

In order that the delegates should receive some definite form of instruction, Dr. Eames offered the following resolution,

which was adopted: "Resolved, that it is the sense of this meeting that the course of instruction in all colleges of this association should be three years of not less than five months each; and that delegates shall submit the proposition to their respective faculties, and report their action to this association at its next annual meeting, in order that a decision on the question may be had." There was an evident feeling at the last meeting of the need for an extension of the college term, and an expressed desire upon the part of the members of the association present to take some decided step in the near future. In order that whatever action is brought forward at the session this fall may be binding upon the several institutions that are members of the association, and in order that each college shall have representation in the meeting and a voice in its proceedings, it is absolutely necessary that certified authority be given the member of the faculty who is sent to represent the college in the association. A full and interesting meeting is expected, and it is hoped that some marked step in the direction of higher education will be taken; therefore, do not fail to come prepared legally to represent your institution.

THE VASCULARITY OF TISSUE.

"The term vascular we use as it is found in the textbooks. We all admit that there is a lymphatic circulation, as, for instance, in the cornea of the eye; but when we speak of an inflammation in non-vascular tissues, we confine ourselves to the generally used terms. True inflammation is always connected with a vascular supply. Red and white blood corpuscles do not penetrate into the normal cornea. It is only after the lymphatics are dilated that the red and white corpuscles can penetrate, and we then have true inflammation set up. The same applies to the dentine, and as the tubes are not dilatable, blood corpuscles cannot enter, so can no true inflammation be set up."

"The only living tissues found in the dentine are the dentinal fibrils, and they are processes of the odontoblasts, and consequently derive their support from the parent cells, which lie in direct connection with the vascular supply. Consequently, it is not necessary to account for any circulation in the dentine except that produced by osmosis, and that we fully accept and have always held."

"There is no question in the minds of working histologists and pathologists regarding the part played by the tooth in the process of decay. The formed material of the tooth is a perfectly passive agent in the retrograde process. The only resistance expressed as the result of irritation to the dentinal fibrils is found in the pulp-cavity, where the persistent odontoblasts lie upon the surface of the pulp, and we call the product secondary dentine."

Foreign Correspondence.

To the Editor.—The following letter received from Dr. Miller may be of interest to your readers; if so, you are at liberty to use it.

Geo. S. Allen.

My Dear Dr. Allen.—I become daily more and more convinced that the explanation I have given of the phenomena of dental caries is the true one and that the inflammatory theory has not the slightest ground in fact, and has been imposed upon us now about long enough. I cannot state the grounds against the inflammatory theory any more clearly than I have in my various articles in the INDEPENDENT PRACTITIONER (especially the article in the April No., 1885). They are first the complete absence of all the cardinal symptoms of inflammation.

2. The absolute impossibility of producing a trace of caries by any of the methods which would cause inflammation of other living tissues of the human body.

The very operation of filling teeth is an argument against the inflammatory theory. If we were to bore a hole in the soft tissues or in bone, and hammer into it a plug of gold it would, in ninetynine cases out of one hundred, be thrown off by suppuration. On the other hand, we can offer no insult of a mechanical nature to a tooth severe enough to produce caries.

- 3. Caries of dead dentine and artificial caries are perfectly analogous with caries of living dentine, a fact which the advocates of the inflammatory theory seem to delight in ignoring.
- 4. The microscopical appearances of carious dentine are not those seen in inflamed tissue.
- 5. There is no change in the structure of dentine where micro-organisms are not present. (This conclusion will be found in the Independent Practitioner for 1883.) That alone is sufficient to render the inflammatory theory untenable, and yet I know of no attempt's having been made to controvert it.

Wherever we have a dissolution of the basis substance, tubuli flow into each other, or caverns are formed by the destruction of a certain amount of the tissue, there we always find fungi and without fungi these changes do not and cannot take place.

We will pass over the old story of the predisposing causes, defective structure, bad development, deep fissures, crowded arch, etc., etc. That teeth in such conditions will yield more quickly to the forces of decay, every one knows and admits. It does not need much acu-

men to tell that a weak body yields more easily to a given force than a strong body. But these things are not causes of decay. If a jaw-bone containing the softest, worst developed, most crowded teeth imaginable were laid away in a box, the teeth would never decay; in the mouth they do decay. Now the question is: What agents are present in the mouth and not present in the box? Why do the teeth decay in one case and not in the other? I have time and again stated the various conditions of disease in which the saliva is said to have an acid reaction. I have mentioned the influence of acid foods and acid medicines.

I have called attention to the extensive destruction of the teeth inaugurated by a grape or lemon cure. I am perfectly mindful of all these agencies, but still it is not difficult to see that they are seldom causes of the caries we are daily called upon to treat. Such acids manifest their action upon the more exposed surfaces of the teeth, with which they readily come in contact (any one who has seen the effect of a long-continued grape or lemon cure knows that), and not upon those obscure points where true caries most frequently occur.

It is usual to speak of the acidity of the secretions of the mucous glands as an important factor in the production of caries of the neck, although I am not aware that any one has as yet demonstrated the frequency or strength of this acidity, or even directly proved that the fresh mucous is under any circumstances aciduous. Herrmann says: "Der schliem ist eine klare schlüpferige, fadenziehende, alkahalische Flüssigkeit," while Kirk (the physiologist), speaks of the mucous as an acid substance, so that until the question has been more carefully investigated from a dental standpoint, we have no right to call in an acidulous mucous to account for everything, of which the real cause may not be apparent.

Still less do I think that the serous exudation from irritated or inflamed gums can be looked upon as a cause of neck-caries. In the first place we have no reason to think that blood serum has any solvent or decalcifying action upon dentine. I subjected pulverized dentine to the action of blood serum for forty-eight hours, and found no lime salts in the filtrate.

In the second place, clinical observations do not appear to me to support this view. We constantly meet with cases of chronic inflammation of the gums, sometimes lasting for years, where the teeth remain intact, and it is notorious that in pyorrhœa alveolaris the teeth are rather less than usual subject to caries. Besides this, when we do find caries in these cases, we must not overlook the

fact that the pockets at the margin of the gnms form recepticles for food, an unfailing factor in the production of caries.

I do not by any means wish to exclude an acid mucous or an acid exudation from inflamed gums; but I look upon the former as an unproved, and the latter as an impossible.

The dental profession is too much given to founding arguments upon suppositions and theories, and are everlastingly bringing forward views and presenting ideas without making the slightest attempt to test their truth experimentally. What we need is facts, and those who cannot present facts had better keep still.

It should be borne in mind that very many bacteria, whether putrefactive or fermentative, pathogenic or non-pathogenic, produce a ferment, which in its action is analogous to pepsin, i. e., it has the power to dissolve albumen and albuminoid substances (to which group of substances decalcified dentine belongs). The destruction of decalcified dentine takes place by solution (just as a piece of cooked egg is dissolved by many bacteria), and may be brought about by any bacterium which produces the ferment referred to.

Voss strasse, 32 Berlin.

W. D. MILLER.

Domestic Correspondence.

TO THE EDITOR:-In view of some late lectures on the germ theory of dental caries, I should like to ask you if the operator who implanted a tooth for Dr. Chas. Andrews, and illustrated his operation in the January Cosmos, showing the solid gold bar running across the tops of three adjoining teeth, did not make a fine nest for the cultivation of bacteria? As I see it, many of the forms of bacterial life are without doubt operative in promoting the destruction of teeth. Promoting, not causing, for they are not known to have promoted the destruction of the teeth of early races, nor of savage races of to-day. We do not know that, as a rule, their teeth ever commenced to decay, for the forms of such teeth as we find in the various museums, which forms probably depended upon their density, show that we may say, their structure, as well as their arrangement in the jaws, all tend to their life-long preservation, and they do so tend to-day among the wild and savage races, and among the physically well-developed members of the most civilized races. I do not mean that there are no apparent exceptions to this rule, but, as Darwin puts it, "the fittest individuals of any given tribe survive," and they survive because their members are fittest to do the work required and fittest to repel destructive agencies.

Before a wall of perfect enamel germs are inoperative and powless, so far as we know. Nature's form and arrangement of perfect teeth is such that this wall must be breached before these microscopic enemies can get any foot-hold. In perfect teeth this wall can be broken in two ways, mechanically and chemically. Bacteria certainly do not act chemically; if they act chemically it is a secondary action. Their primary action is probably that of scavengers, but if such multitudes are needed to do the scavenger's work that they fall in their tracks, the products of their living and dying may become what we call the chemical agent that is a solvent, and thus we again approach the question: "which is first, the egg or the hen?" that is, do bacilli produce acids, or acids bacilli. It is well for us to know that these microscopic organisms promote decay, when once decay is started. Is it not therefore better for us to prevent decay from starting?

If all crevices and crannies existing in a tooth can be filled with any indestructible substance; and the surface made flush with the smooth surface of the tooth, so that it may all be kept clean from deposits on every side, that tooth is practically free from decay so long as it is kept clean; but if, on the contrary, a special nest for the breeding, not of pure cultures, but of multifarious bacteria be made, what shall we say?

E. A. Bogue.

To the Editor:—Thinking that it would be of interest to the profession at large, I desire to place on record in our literature a case of supernumerary teeth, reported at a recent meeting of the Academy of Natural Sciences by Prof. Joseph Leidy, M. D. He exhibited a portion of an adult French skull which had an unusual case of supernumerary teeth. All the teeth were solid and undecayed. It presented an abnormally large central, almost equal in width to a double central. There were also four molars, all well developed and situated in the regular line of the arch. There have been on record many supernumerary molars, but being always outside of the arch, I do not know of any with this perfect arrangement. The skull also presented two other abnormalities, a peculiar pouch-like enlargement of turbinated bones, and a very small jugular foramen on one side, it being nearly obliterated.

Philadelphia, March 5, 1888.

L. Ashley Faught.

To the Editor:—At the last meeting of the Boston Society of Natural History the president of the society, Prof. F. W. Putnam, in giving an account of an Indian burial place at Winthrop, near

Boston, recently discovered and opened, mentioned one skull that "had a thin copper plate over a portion of the forehead." Cloth, woven from twisted vegetable fiber, covered the plate and the bark of some tree was over that, and fine yellow alluvium mixed with fragments of shells was over all to the depth of two feet to the westward sloping surface.

The vegetable materials in contact and near the plate had been preserved from decomposition; also, the hair, skin and bone beneath the plate as well as the brain, which was dried into a small compact mass, adherent to the bone next under the plate.

The bone was colored green under the plate. Copper salts had, probably, been the preserving power that had warded off the attacks of decomposing bacteria.

I mention this as of general interest to our profession at this time, when copper amalgam seems to have a fresh start, as showing the protective power of copper in one of its salts—the carbonate.

GEO. F. WATERS.

Current News.

Attend the dental conventions this year.

Read "Current News" in this and last issue for notices of summer meetings.

Write to Dr. Crouse, and he will make an appointment to meet you at some of them, and "take" you into the *Dental Protective Association*.

Don't wait until an injunction has been served upon you. It will then be too late, and you will have to settle or fight alone.

Don't forget that the Dental Protective Association will bear all the expense of suits brought against individuals after they have become members of the association.

Send ten dollars to Dr. J. N. Crouse, 2231 Prairie Avenue, Chicago, and dismiss all care. He will your burden assume, and make the pathway of the agent of the International Tooth-Crown Company bristle with thorns.

The State of Minnesota has just passed a most excellent law governing the practice of dentistry within her borders. The new law takes the place of the one passed in 1885, and is considered to be a decided improvement.

Dr. A. H. Thompson gives it as his experience that bichloride of mercury turns a tooth as black as his hat! Has any one else had similar effects? No one was found at the Chicago meeting to corroborate it.

Dr. Sudduth says that in opthalmology silico-fluoride of soda is replacing boric acid, after much careful experimentation. It is non-irritant, non-poisonous and is a good disinfectant.

Dr. A. W. Harlan is of the opinion, though empirically, that the essential oils possess properties hitherto unsuspected or overlooked, notwithstanding their recognized value as household remdies.

Dr. Black says the whole subject of antisepsis is young yet. As we proceed in our investigations and grow in knowledge, we are liable to have to take out whole blocks from our foundation, and build anew; flaws may be found in our technique which will prove our results all wrong; but we must continue to work at it.

- Dr. J. H. Wooley says that after the work of disinfection has apparently been done by drugs, and we consider the root in condition to fill, application of a heated broach will frequently reveal the characteristic odor of sulphurated hydrogen showing that decomposition still lurks in the canal. This can be more effectually overcome by the aid of the heated broach than by any other method.
- Dr. Curtis says that women accustomed to the quiet of home frequently associate noise with pain, and that our operations for them should be as quiet as possible; to many the filing and cutting in the laboratory are not to be endured. So of smell; the odor of creosote recalls a howling toothache; that of chloroform, the lancing of a felon; of iodoform, the dressing of a painful wound. Let nothing about the office recall these painful associations.
- Dr. C. M. Bailey says that while the experiments of Dr. Black prove positively that iodoform neither destroys nor inhibits the growth of microbes, even in the undisolved powder; yet we find in clinical practice that it does prevent the formation of pus! Iodoform in eucalyptus oil—both valueless according to Dr. Black's tables—we find will most perfectly sterilize an abcessed root and induce perfect healing. It may be empirical but it succeeds!
- Dr. T. E. Weeks, Minneapolis, holds that after all mind cure in one form and another is the great dependance in operating on sensitive dentine. Gain the confidence of your patients, show them that you know just what to do, and just how to do it. To be

able to do this you must have a thorough knowledge of tooth structure, of both its organic and its inorganic domains, so that you will run no risk of passing the boundary line; otherwise it is like playing with fire.

Dr. Pruyn warns earnestly against the fascinating and seductive dangers of cocaine. He says the cocaine habit is far worse than alcohol or morphine; the demand will not be denied. Especially he warns against the danger of self-injection.

Dr. Pruyn says that no man should use cocaine in his dental practice who has not studied its effects upon the lower animals, even to death. In that way only can be recognize all the symptoms and know their value and indications.

Dr. Martindale says that in necrosis of the lower jaw, the external plate is frequently bulged out by the inflammatory effusion between the plates. In some cases the effusions force an outlet and the plate collapses; in others the effusion organizes new products and the cavity becomes filled with new bone, and a permanent bony tumor is the result.

In obtunding sensitive dentine by electrolysis, Dr. McGraw uses a 12 per cent. solution of cocaine in absolute alcohol and alum. This is placed in the cavity on a pledget of cotton, the positive pole being placed on the cotton and the negative on the cheek; the galvanic current from four cells is then passed through for three minutes, and repeated after an interval of three minutes. He gets the anesthetic action of the cocaine and the dessicating effect of the alcohol.

- Dr. L. Davis, Chicago, says that so far, the porcelain fillings that he has seen, which were made by Dr. Land's method, with platinum back, are not what he would want either for himself or for his patients.
- Dr. D. F. McGraw enumerates among the advantages offered in obtunding sensitive dentine by electrolysis, that it is not patented, that it is safe with no possible evil results, that it necessitates no high priced drugs.
- Dr. G. E. Weeks, Minneapolis, in his paper on sensitiveness of dentine and its control, read at the Chicago Dental Society meeting, said that nominally the pulps can only transmit a sense of pain from change of temperature but that the degree of temperature can only be distinguished by the aid of the tongue and lips. It has no tactile sense.

Dr. Comstock holds that the artistic adaptation in prosthetic dentistry can be systematized and taught as it is based entirely on well-known art principles and a knowledge of facial anatomy, and the science of physiognomy or facial expression.

Dr. C. Thomas, Des Moines, Iowa, makes his own porcelain inlays and fillings, for all kinds of cavities, contouring corners of incisors, building up molars, etc. No matter what the shape of the cavity he burnishes into it platinum ribbon, forming a matrix in which bakes the filling. A platinum pin, or two if necessary, is baked in the patch a corresponding pit being drilled in the tooth for the reception of the pin. The fillings are set with oxy-phosphate cement.

Dr. Allport regards the attainment of the ideal in prosthetic dentistry to depend upon its taking rank as an art, with painting and sculpture. It must be recognized as the special province of only the very few who can hope to attain the requisite perfection in artistic productions. Our colleges should understand this and teach it as such an art, not to be relegated to an obscure mechanical workman back in a labratory workshop.

Dr. Dorance, Michigan, thinks that from the superior density and better color of artificial teeth, better results will be obtained from fillings made from pieces of broken teeth than from inlays made from the model of the cavity and baked in a platinum matrix, though far more skill is required to grind and adjust the former. He does not think the method of universal application at present, but considers it well worthy the thought and efforts of young practitioners, as the filling of the future.

In the discussion of Dr. Andrews' lantern exhibit, Chicago, Dr. Black said that while there could be but one opinion as to the function of microbes, his own work made him less positive on the subject of calco-globulin. He had observed the thin onion-like spherical formations in mal-formed teeth where all is chaos, in softened bone after inflammation of the pulp, about the ends of the long bones in young animals; we might expect some abnormality in those positions, or when left to chemical action in jars in the laboratory where life forces have no play. But as shown in the illustrations shown by Dr. Andrews he thought it might possibly be due to some post-mortem change. In his own work he had found that in the use of certain reagents he got that formation very frequently, while in other modes of work he got none.

When, from excessive brushing or other causes, the gums have receded leaving the necks of the anterior superior teeth exposed, Dr. A. H. Thompson (Topeka), makes an almost imperceptible restoration to natural appearance by inlays of gum-colored porcelain, to which he gives the fullness of the natural gum. By careful selection of the proper color, making from the gum-portion of artificial teeth, grinding to the proper thinness from the tooth-body side, and setting in cement so colored as to still further assist the disguise, a most perfect restoration to normal appearance is made, as was demonstrated in the clinic given at the Chicago Dental Society meeting.

The Thirteenth Annual Meeting of the New Hampshire Dental Society will be held at Concord, June 18 and 19, 1889. All members of the profession invited to attend. Reduced railroad fares. The Board of Censors will meet any candidate for license Monday evening, June 17th, at the office of the Secretary.

EDWARD B. DAVIS, Secretary.

CHICAGO DENTAL SOCIETY.

At the annual meeting of the Chicago Dental Society, held on Tuesday evening, April 2, 1889, the following named were elected officers for the ensuing year: P. J. Kester, President; D. M. Cattell, First Vice-President; W. J. Martin, Second Vice-President; A. E. Baldwin, Secretary; Louis Ottofy, Corresponding Secretary; E. D. Swain, Treasurer; A. W. Harian, Librarian; Member of the Executive Committee, J. Austin Dunn; Board of Censors, F. H. Gardiner, C. F. Hartt and L. L. Davis. Delegates to the International Dental Congress at Paris, France, September 1 to 8, 1889, were appointed, as follows: A. W. Harlan (Secretary), J. N. Crouse, T. W. Brophy, J. A. Swasey, P. J. Kester, W. W. Allport, A. E. Baldwin, Louis Ottofy, L. L. Davis, J. W. Wassall, and W. B. Ames.

A report from Dr. Crouse showed the Dental Protective Association of the United States to be flourishing, and dentists throughout the United States are requested to become members of this. Association.

Louis Ottofy,

Corresponding Secretary.

THE

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Original Communications.'

DENTAL EDUCATION.2

BY EUGENE H. SMITH, M.D., D.M.D., BOSTON.

No one comes in contact with candidates for graduation in dentistry who is not compelled to admit that there is need for a more thorough training for students before admission into practice. The deficiency is only too apparent, but the remedy is not so plain. Decidedly different views are held as to the required additions to our present accepted curriculum in order to bring about the desired result. Among dental practitioners we find two extremes: the first relies entirely upon mechanical means, the second upon theory for the basis of practice. Both these positions are to be deprecated, and it is a question as to which class has done the most The mechanical practitioner, wholly devoid of any knowledge of the physiological principles that underlie his work, has destroyed hundreds of teeth, and brought about the consequent evils. The dental medical practitioner, with mechanical ideas not only foreign, but considered quite beneath him as a professional gentleman, has placed fillings in the teeth he would save, as he would drop pills into the stomach of his patient, or has dosed them with some nostrum that he was quite sure was the antidote for further decay. and contemplated the great possibilities of the profession when all its practitioners are doctors of medicine, whilst his failure to save

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read before the American Academy of Dental Science, Boston, Mass.

teeth is quite as apparent as that of his mechanical brother. Dentistry as I see it, requires to a great degree a practical training, and the successful man must possess in the beginning manipulative ability of a high order. For certain it is—however much some may wish to deny it—mechanical skill is largely at the foundation of our calling.

To raise this calling to a higher plane is the duty of us all, and I think it is with this end in view that many good men have obtained for themselves, and are strongly advocating for others, the degree of medicine; while some, I regret to say, have obtained it simply and solely as a means supposed to elevate them above their fellows. This is no idle assertion, for I assure you as a fact that I have been addressed by men considered quite willing to obtain it, even at a slight mental cost, on the ground of its giving the holder a higher professional atmosphere and admission into the ranks of physicians. I assert, without fear of well-founded contradiction, that our best practitioners of to-day are quite as likely to be found outside of those holding the medical degree, and that the better practitioners now holding that degree are not indebted to it for their superiority as dentists. American dentistry is indebted almost wholly for its rapid advancement in the past seventy years and its recognition by the public as an important calling to the practical ingenuity of the leading men, and its continued advancement, in my opinion, must come through the same channel.

Our methods of treating irregularities are far from perfect, and must be developed, if developed at all, through mechanical means; for beyond the physiological principles underlying the movement of the teeth, I cannot see that medical knowledge can be of any great use. It is so in the filling of teeth and in the large majority of the operations now performed, or which are advisable to be performed, by the dentist. The mistake which I think the advocates for the medical degree for dentists make is, in assuming that the holding of it elevates the standing of the profession. It elevates it only in that it merges it with another profession that already takes a high standing among the learned professions; but the high standing in this case was brought about through those men that were in the beginning liberally educated-men possessing a collegiate education. The ministry was considered for a long time the most learned calling, and why? Simply because it had among its devotees more bachelors of arts than any of its sister professions. This is now changed, or changing, and learned men are found in

great numbers in other callings. Our own profession needs the influence of this class of men, and when they come, as come sometime they will, then the practical work will lose some of its present odium—odium attached to it, through the false ideas of antiquated thinkers—then will our profession rank among those considered learned.

Every teacher in our dental schools will agree, I think, with me that where students fail the most is in the practical portion of the work. To-day it is no uncommon thing to find students that pass all the theoretical branches with great credit, and yet have the utmost difficulty in passing the practical departments, and no teacher of dentistry, however strongly he may think the degree of medicine necessary, can conscientiously pass a poor manipulator. This fact alone proves that more time is actually needed in the practical departments, and all observers of the present results of dental education, I think, will concede it. To accomplish this more time must be added for work in the practical departments. A course of three full years is really necessary for training in the manipulative part of dentistry and in the studies pertaining strictly to dental practice. In order to obtain a liberal education as advocated by those who hold for the possession of a medical training, besides the degrees in arts and dentistry, requires at least ten years' study. Is dentistry, I would ask, a profession of such magnitude as to require more training for its practice than any of the other professions? I think not-consequently we must trim the curriculum advocated.

The question then arises, what can we best give up? A liberal education is at the foundation of everything scientific and learned, consequently this cannot be cut out, and as I have already affirmed that the dental studies require more, rather then less time, then there is no chance for trimming in that direction, but I do see a chance in the medical department. For I cannot see any practical use in the dental student's studying obstetrics, diseases of women, skin diseases, the minute anatomy of the body, nor entering into the more complex problems of physiology and other medical studies that I might add to this list; but the medical advocate replies, if you throw them out you forfeit the medical degree. I admit it; I am willing that it should be forfeited. If the degree is of no practical use for us as dental practitioners, why should we wish it? I think the notion of a medical education for a dental student found its place in the minds of men through the fact that a medical education was obtained by many of our early dentists;

this was greatly to their credit, for at that time dental schools were unknown, and they got what theoretical knowledge they could of dentistry through medicine—certainly it was that in pursuing this course they got but very little knowledge of our specialty; and they themselves found it necessary to establish special schools for more thorough training; and from that time through their influence we have made most wonderful advancement, and continued progress must come, so it seems to me, through the perfecting of these special schools.

Some of the graduates in medicine have said they hoped to see the time when the degree of medicine would be required of every dental candidate. Some of these same gentlemen could have put their time to a better advantage than getting the medical degree by making up for some of their deficiencies in the more common branches of study. I should much rather see the time when our dental schools could increase their curriculum, and require the degree of A.M. Many States, as you know, require of the practitioner a degree in medicine or in dentistry, before he is allowed to practice dentistry. This is excellent in one way, and all wrong in another. The idea that a doctor of medicine, without any dental training is fitted to practice dentistry, is preposterous; yet, all these laws are so framed as to admit it. Let a student enter one of our medical colleges with no knowledge of dental practitioners' being in existence, and no outside means of ascertaining the fact during his course of study, we all know he could graduate, and still be entirely ignorant of our profession. In my own practice I have had cases where physicians have treated neuralgia of different parts of the body for weeks and months, when the whole cause of the trouble was to be found in some dental lesion.

A case recently came into my hands where a physician had been treating with internal exhibition of medicine, an abscess of an upper incisor, for malaria; and although the patient showed no other sign of this disease he pronounced it local malaria at that point, and so dosed her accordingly. It is needless to say that the local malaria, so-called, readily yielded to the proper dental treatment. Many other cases, equally absurd, I could mention, which have come under my observation. Now, the many cases of the kind that are on record show conclusively, that an education in medicine simply by no means fits a man for the practice of dentistry, and that the clause in the laws of States admitting men so educated to the dental practice should be repealed.

In closing, allow me briefly to express my ideas of the elevation of dentistry. First, a preparatory education, which must be liberal, and which, in my opinion, can best be obtained in an institution where, together with a liberal education, manual training is made an important branch; for, as I have said before, I believe mechanical skill is really at the foundation of dentistry, and this skill must be born with the child, or else acquired very early in life. From here to the special dental school, where enough of the medical science is taught so that the dentist will learn sufficient to know when a trouble of the mouth belongs to the surgeon proper, and turn it over accordingly; where special dental structures are more thoroughly taught, and where his previously acquired mechanical skill can receive that special training needed to make a skilled operator and a fine mechanic. When this time comes, you will see the elevation of your profession called, learned with the others, and with this advantage: that our science will be the most exact.

REGULATING APPLIANCES.

BY EDWARD H. ANGLE, D.D.S., MINNEAPOLIS, MINN.

Among the many forms of dental irregularities, that form characterized by excessive prominence of the superior oral teeth

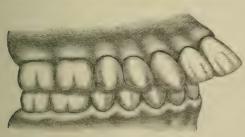


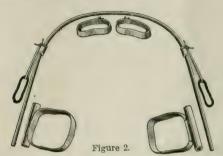
Fig. 1.

illustrated in Fig. 1, is one one which has always been regarded as difficult to treat, and the results have usually been far from satisfactory. It would be interesting to know the percentage of such irregularities; but upon this point our literature is very meagre. Judging from

the number occurring in my own practice, and from the large number of models received from other dentists, I am inclined to believe that the percentage is far larger than is usually supposed.

It would be interesting to consider the causes that contribute to this deformity; but which, owing to lack of time, must be deferred to the future, it being my purpose now only to describe an appliance for the treatment of these cases.

I think all those who have had experience in treating dental irregularities will agree with me that, where so many teeth are to be drawn back, the molar teeth are insufficient for anchorage. Owing to this insufficiency, the usual result is that the molar teeth are tipped forward and faulty occlusion established, without accomplishing the desired result.



The value of the occipital bandage, as a means of anchorage is, I believe, becoming more and more appreciated, and is especially applicable to this class of cases. I am using the appliance herein described, in my

sixteenth case, and I consider it much more satisfactory than any of the few devices which are described in our literature on this subject. This is shown in part, in Figure 2.

It is made and applied as follows:

The first molars are carefully and accurately banded. These bands may be made of gold or platinum; but what I regard much better than either, on account of its tensile strength, is German silver, rolled to No. 36 guage, shown in F in Figure 3.

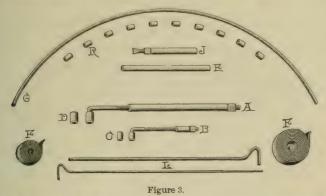
Little pipes about five-eighths of an inch in length are soldered on the side of the arch to the bands. A wire of hard drawn platinized gold, about No. 19 gauge, and long enough to encircle the arch is now carefully bent to conform to the shape of the arch, if the arch be correct in form; but if it be contracted or the teeth irregular, no attention is paid to the form of the existing arch, but an ideal arch for the case is made by bending the wire arch to the exact shape to which we wish the teeth in the arch to arrange themselves when the operation is completed.

The ends of this ideal arch are now slipped into the pipes on the molars. The anterior part of the arch is kept from sliding up and impinging upon the gum, by resting in suitable niches formed in the delicate bands encircling, and cemented to the central incisors.

It will also be seen by referring to this cut that two small pipes or collars have been slipped on the wire arch, and are shown in the region of the cuspids. (Also shown at R, Fig. 3.)

These collars are prevented from slipping by being previously

soldered into place, care being taken to use soft solder, that the temper may not be drawn from the wire arch. The collars are for



This cut illustrates the full set of my regulating and retaining appliances. Not all the pieces are used, however, in the appliances described in this article.

the purpose of preventing the silk ligatures shown in the cut from slipping backward on the wire. These silk ligatures serve to attach delicate rubber ligatures, which have been hooked over the ends of the little pipes on the anchor teeth, and are represented by dark lines in cuts 2 and 4. The use of these rubber ligatures will be explained further on. Fig. 4 represents a traction bar used in conveying the force from the occipital bandage and distributing it to the wire arch.



A spur about three-eighths of an inch in length will be seen in the center of this bar, it has a deep niche in one end, which when in position, is placed in contact with the wire arch, at a point between the central incisors. Heavy rubber bands are now attached to the occipital bandage, the other ends being hooked over the end of the traction bar. Shown in position in Fig. 5.

If the reader is familiar with the appliance so far described, it will be seen that the force received from the occipital bandage, is distributed to the wire arch practically through a ball and socket-joint, as the ends of the traction bar may be moved in any direction without interfering with the pressure from the bandage.

The main feature, however, is that in consequence of this freedom of motion, any jar or shock upon the traction bar, will not be transmitted to the tender teeth. As the bandage and bar are to be worn only at night, shocks from contact with the pillow would be very liable to occur, and be very painful were it not for this ball and socket-joint preventing the jar from being transmitted. This is a point of advantage, which I think all will appreciate, and one possessed by no other device with which I am familiar; as the usual method is rigidly to attach the traction bar to a swaged or vulcanized cap covering, and firmly resting against all the teeth to be removed.

As the heavy rubber ligatures of the bandage act during the night only, provision must be made to hold through the day what is gained at night. This is accomplished by the delicate rubber ligatures already described.

It will be seen that as the wire arch is forced back through the tubes, the delicate ligatures will prevent it from springing forward, thus suppporting and effectually preventing the loosened teeth from springing back and interfering with the healing process. This is a principle of much importance, and should be carefully observed in the movement of all teeth. And when disregarded, as is too often the case, excessive soreness and much suffering is the inevitable result.

Another advantage of this device, is that not only is prominence of the teeth reduced, but teeth that are irregular are gradually forced to take regular positions, and conform to the shape of the ideal arch, something impossible with devices having fixed caps of vulcanite or gold. Another advantage: if the arch needs expanding, which is frequently necessary in these cases, it may easily be accomplished at the same time the teeth are being moved backward by tightly lacing to the wire arch such teeth as need to be moved outward.

As for the bandage proper, I greatly prefer the common silk travelling cap, shown in the engraving, or the knit jersey cap, to the contrivance usually used for this purpose, as these fit the head snugly, thereby distributing the force exerted by the strong ligatures over more surface, and are consequently more easily worn. Two ligatures should be attached to the cap, one above the ear, and one below, as shown in Fig. 5. If the bands be of equal width, the force will be exerted in the direction of the meatus of the ear.



Figure 5.

This is the point to which the force in most cases should be directed; in some cases, however, the teeth should be compressed in their sockets as well as drawn backwards. This is easily accomplished by dispensing with the ligature below the ear, using the upper ligature only, but of double strength, attaching it at a point on the cap as far forwards as is desired. Again, if elongation of the teeth be necessary, as they are moved backward, the lower ligature only is used, dispensing with the upper. Thus it will be seen, that we have complete control of the moving teeth. After the teeth have become moved into the desired position, they are effectually retained by the wire arch; keeping the same by passing a delicate drill through the pipes on the anchor teeth, and inserting neatly fitting pins into the holes thus made. The head-gear and delicate ligatures are then, of course, dispensed with; the patient will wear this retainer without inconvenience as long as desired.

The traction bar and bandage may also be used to advantage in the movement of a single outstanding incisor. For this purpose the tooth is banded, and two pipes, shown at R. Fig. 3, are soldered to the anterior surface of the band. Through these pipes is passed a bit of the gold wire, about \(\frac{1}{4} \) inch in length, shown at G, Fig. 3. This wire is fastened in place with solder, and the traction bar applied as to the wire arch in the previous case. This little device is shown in Fig. 6.

The bandage and bar may be used to assist in the double rotation of the central incisors. Fig. 7 shows a case of this kind.



where the centrals stood considerably turned across the line of the arch. The two teeth were banded, and two of the pipes, shown at R, Fig. 3, were soldered to these bands, one horizontal and the

other perpendicular. A piece of No. 13, German piano wire-heavier need not be used-is bent in the form of a hook and placed in position as shown in Fig. 8.



The tendency of the wire to strenghten itself, as shown by the dotted lines in Fig. 7, will, in a short time, rotate both teeth. It may be necessary to remove and straighten the wire to give it enough spring to do all the work. This simple device will itself,



Fig. 9.

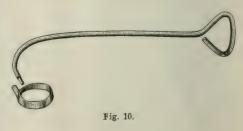
in most instances, speedily accomplish the desired result; but in some instances, where there is much lateral pressuer from the other teeth, or where the external plate of the alveolus is very thin, there may be a tendency for the teeth to spring outward as they rotate. In this case, the bandage and bar may be applied for a few nights, and will effectually prevent any undue

prominence of the teeth, which are being rotated.

This apparatus may be used in almost the same way when single rotation is being accomplished, as shown in Fig. 9, and there is any tendency of the rotating tooth to spring forward.

The bandage, with a modification of the bar, as shown in Fig.

10, may be used in drawing back that very difficult tooth to move, the The cuspid is cuspid. banded, and to the band the pipe shown at D, Fig. 3, is rigidly soldered. A wire bent in form of a hook, as shown



in Fig. 10, is fitted snugly into this tube, and the heavy elastic is fastened from this hook to the cap on one side only. The snug fit of the hook into the pipe will not permit of any rotation, as the tooth is drawn back, and the tooth is easily and quickly tipped back into position.

Other appliances of the bandage and bar might be given, but will suggest themselves to any one using this valuable appliance.

CONDITIONS WHICH PROMOTE OR RETARD THE PROGRESS OF DENTAL CARIES.*

BY C. N. PEIRCE, D.D.S., PHILADELPHIA.

The pathological condition designated "Dental Caries" is certainly one of the most frequent and most serious affections to which the teeth are liable, and educated dentists are all united in characterizing it as a "progressive and often continuous softening from the exterior to the interior of the crown, until a larger portion, or the whole of the tooth affected has gradually disappeared." Much of the labor of the dentist is employed in more or less successful efforts to modify, or arrest the progress of this destructive disease, and to restore as far as possible the ravages it has made in the organs under his care.

To do this intelligently, and with the most favorable results, many things are to be comprehended, and their influence appreciated and wisely heeded. If we attempt to tear down or disintegrate any structure, organic or inorganic, this labor is facilitated by a knowledge of the tissues or molecules of which it is composed, and of the manner of construction; so, also, if the attempt be made to stay or modify the influence of the antagonisms of its environment, the same knowledge is helpful to the success of such efforts.

^{*} Read before the Odontological Society of Pennsylvania, March, 2d, 1889.

In pursuance of this thought, first to be recognized, are the facts that in the segmentation and aggregation of living cells, primitive integuments are formed, and from one of these the tooth germs have their origin, and that the processes through which this germination takes place are always liable to modification by the *interruption of nutritive distribution*. Histologists note also, that the impulse which establishes the individuality of the tissues, as well as that of the organ, must be given to it while in this immature and plastic condition, and that now also must the laws controlling heredity and adaptation to function, exert their morphological or formative influence, and through these and the nutritive currents, must be evolved the differentiated structures resulting in the ameloblasts, odontoblasts, and other tissues which are so essential to the development of the complex tooth.

After months of vital activity and continuous change, what were simple homogeneous cellular structures, become complex heterogeneous tissues, and efforts at specialization have resulted in a dissimilarity preparatory to a most remarkable process of solidification. In this latter process, the previously mentioned ameloblasts and odontoblasts (specialized cells only), in their functional duties have produced structures marvellous in density and (with aided vision) in beauty; and when these are normal in shape, and continuity, they are unequaled in their power of mechanical resistance by any other organic structures.

The morphology of the individual enamel cell, fiber or prism, is not arbitrary, or the result of a whim or accident, but a mechanical necessity, essential to the density of the structure. other shape but hexagonal could they be to make a compact and solid structure of normal shape and size? Who would not recognize the spaces in a bundle of cylindrical bodies, however tightly they may be bound together? And, if brought under pressure sufficient for solidification, the hexagonal shape must most nearly be approximated in the individual integrals. The crown of dentine, upon which these enamel cells rest, with the line of their axis almost vertical to the coronal surface, is not a plane in any sense of the term, but is made up of wavy or irregular elevations and depressions, and upon this uneven foundation these cells must rest, varying in the line of their perpendicular position, and in their density, the latter quality being in correspondence with their near or remote position regarding nutritive supply, and their previous, as well as their prospective, functional activity. The normality of this enamel tissue, with its maximum resisting power, is dependent

largely upon the general or systemic condition during the period of its development and calcification. Its vices of conformation and pathological predispositions, which make this tissue an easy prey to an acid environment, are exhibited in a want of continuity of the cells, and an imperfect calcification of the same, inducing pits and ragged or roughened depressions, all which are factors in dental caries, through their power of absorbing, and retaining in contact with the tissue, a destructible agent; hence it is of the utmost importance that the influences of these possible conditions should be recognized and appreciated.

The dentine structure, possessing a much larger per cent. of organic matter, is necessarily, by virtue of this, less dense than the enamel; and though originating like the enamel from a homogeneous cellular germ, it is evolved only through a multitude of progressive changes, culminating in a double layer of highly specialized odontoblastic cells, and their conspicuous prolongations, covering the coronal surface of the plastic mass, known as the dentine matrix or papilla. These odontoblastic cells are recognized to be the final effort of the plastic cellular mass, previous to the depositions, or secretions, of the salts of lime; and to be themselves the active agents in the elimination of the mineral substance which forms the tissue known as dentine.

The dentinal portion of a tooth is of the three dental tissues the most constant, and yet the most varied in its histological development, displaying structural peculiarities in the same species, and marked differences in different species. It affords the solid foundation upon which the enamel fibers rest, and conveys to them about all the nutrition and sensation they possess, after the tooth crown has once been thoroughly deprived of its vascular covering by complete eruption. Indeed, it is the only medium through which the enamel can have any arterial or nervous connection, after it has passed through its enveloping sack and the gum, except the little it may receive through the thin margin of cementum, with which it comes in contact on the neck of the tooth. The tubuli, which permeate the dentine, and open with their largest diameters upon the pulp chamber, giving an impetus to the ingress of fluids, are, when the tooth is in normal condition, a source of strength and nutrition; but when the organ is attacked with caries, they become a source of weakness, and facilitate its decalcification and the subsequent decomposition of the organic matter which has served as a matrix for the inorganic. The dentine, like the enamel, is liable to imperfections, or structural defects, from disturbed or

mal-nutrition, a sequence of constitutional abnormalities. These defects may be slight or serious, varying with the severity or duration of the disturbance.

They may consist of masses of semi-calcified dentine, or of cells or spaces known as "interglobular spaces," distributed throughout the body of dentine; though they are more frequently recognized near the zonal line, between the enamel and dentine, which makes them more important factors in favoring decay. The infolding upon themselves of the terminal ends of the tubuli, and the more frequent diseases of childhood, are probably two of the causes to which this appearance or condition may be attributed.

These recognized vices in structure are entirely harmless, while the mail, which nature has provided for the dentine, remains intact; but when the enamel rods become broken, decalcified, or otherwise disturbed, so as to admit the ingress of a solvent, they become actively accessory to dentine decalcification, and subsequent disintegration, as do also the tubules themselves; and they do this through their power, first of admitting the solvent, and second of affording habitat and protection to organisms which consume and disintegrate the organic material of the tooth, and supply as their product a mass which re-acts as a solvent upon the salts in the surrounding structure.

The cementum which covers the dentine of the root and is itself covered and nourished by the cemental or periodontal membrane, is less dense than the dentine, possessing a larger percentage of organic matter than does that tissue. It is, as compared with enamel and dentine seldom attacked by dental caries, for the reason, that when in normal condition, it is protected by its membranous covering. But when by virtue of location and surrounding influences, it becomes the seat of caries, the increased amount of organic matter it possesses and the pabulum and protection it offers to minute beings, greatly favors its progress and that too with more than usual discomfort to the patient. In connection with, or under the gingival borders of the gums and cervical margins of the alveolar process, it is not only an accessible cavity to fluids, but one that encourages the lodgment or impaction of food which in its fermentation, facilitates the advancement of the disease. In its structural arrangement cementum differs from dentine, but not in a manner to protect it from the ingress of fluids, when once its lacunae and canaliculi are exposed.

The organic matter of these two tissues, dentine and cementum, by continuity and interlacing of their fibers with one an other, is a source of sensation or nervous impulse and nutrition to the for-

mer dentine. This union and sympathy so frequently manifested' between dentine and cementum is by dentists recognized in a tooth in which the pulp has been devitalized.

The chemical composition and predispositions of these dense dental tissues, must not be overlooked in a paper on dental caries. The fact that tooth density is almost wholly due to the presence of the salts of lime, and also that some of the acids which are at times found in the mouth, either as a result of systemic or of local conditions, readily act upon this inorganic material is important, and must be noted as a factor concerning the possible chemical changes taking place in the oral cavity. The secretions of the mouth, which, without cessation, are being emptied into it from its numerous glands, are of a constantly varying quantity and quality being subject to these modifications, through both systemic and local condition.

But it matters not what the origin of their normality or their abnomality, of their benign or their vicious influence, the effect upon the teeth is the same, and dental physiologists, and pathologists, must recognize in the saliva, an important factor in favoring or in modifying the progress of dental caries.

To ascertain with any degree of certainty the influence the fluid is at the time exerting upon the teeth, access can and should be had to some convenient and simple test, such as litmus paper, which when turned from blue to red, or restored to blue from red, gives with a good degree of certainty the acidity or alkalinity of the secretion.

It has just been stated that this salivary secretion varies through either systemic or local conditions.

The first inquiry that naturally arises from this statement is whether there is any one period in the individual's life, so far as age is concerned, when there is a greater tendency to an acid abnormality than another.

Second, whether there is any abnormal systemic condition that may favor or induce this unfavorable condition of the oral fluids.

Third, whether there are any physiological processes which may induce the same destructive tendencies in their secretion.

That the observing dentist recognizes a greater tendency to dental caries in the young than in mature or middle life, needs only to be suggested to be appreciated, and that this is partially or indeed largely due to a prevaling acidity of the saliva is quite as patent. But the reason for the prevailing abnormality of this fluid

is not quite so clear—youth or immaturity per se, would not be a satisfactory explanation, so we must look for conditions accompanying this.

It is not probable that in this period of growth the demand made upon the nutritive currents for the building of the osseous structures would exhaust their supply of calciferous element, and hence so rob the blood of this ingredient that the secretions would on the slightest provocation present an acid reaction, and, again, with this minimum quantity of the essential salt, would not fermentations also be more active and their results manifest greater vigor, thereby producing that condition, so almost universally observed in the youth of both sexes, viz., rapidly progressing dental caries?

The lines of systemic normality and abnormality run so nearly parallel and contiguous, that the slightest deviation of the former may encroach upon and assume the rôle of the latter with all its attendant consequences. It is of little moment so far as the influence it may exert upon the oral secretions is concerned, whether this deviation be caused by states of fatigue—mental or physical—by anaemia from deficiency in quantity or quality of blood, by malaria, or by still more serious deviations, complicated with typhoid conditions. These abnormalities, would, one and all, if of sufficient duration, record their presence upon tooth structure, to be modified only by present or previous local conditions which would have power to retain their activity and destructive influences.

Physiological processes, may by taxing localities or organs, induce an irritability of the nervous system, or they may instigate what in medical parlance is termed nervous prostration, which acts very unhappily, not only upon tooth environment, but also upon the resisting power of the tooth itself; so that during periods of gestation and lactation as well as periods of prolonged intense mental application and anxiety, the dentist's labors are not only in greater demand, but his skill is taxed to its utmost, to keep such patients comfortable until the much needed operations can be better performed and sustained.

The effect of the above enumerated conditions is frequently first recognized through the accumulations upon the teeth. If these are of an acid and soft cheesy consistency, it is safe to assert that the dental tissues are suffering or soon will suffer from their environment, unless some remedy be applied to counteract its influence. On the other hand, a change from these abnormal systemic conditions to a more healthy physical state, is soon predicted by a change in th

nature and consistency of the deposits upon the teeth. If these should be firm in attachment, dense in structure, and varying in color from a dark cream to a black, dental earies, if progressing at all, is not from the influence of the glandular secretions, but from a product of the fermenting accumulations of food or debris, in the interstices or sulci in the crowns, or spaces between the same; in a word, from want of cleanliness. These conditions and their results are so readily observed, that with safety the assertion can be made, that the presence or absence of tartar or salivary calculus, or its tendency to accumulate, or the reverse, is of great significance regarding the progress of dental caries.

In recognizing the variety of influences that may promote or retard the progress of dental caries, the fact must not be overlooked that they do not all act simultaneously, nor are they all necessarily of equal duration. Conditions which may be termed predisposing causes of decay may be present in a marked degree in the form of vices of conformation, deficiency in quantity and quality of enamel and dentine, yet in as conspicuous a degree may decalcification of these abnormally developed tissues be absent. And again, the exciting cause of caries may be present in the nature of abnormal secretions, and their influence may be stayed or greatly modified by a previous condition of tooth structure, by cleanliness, and ant-acids and anti-septics. The vitality of the tooth, and its recuperative power, are factors here which must not be overlooked, for the resistance which they offer in their antagonism to decay is important.

The principles involved in prophylactic treatment, and the proper selection of agents exerting such influence, should not be disregarded. The value of therapeutic measures when systemically indicated must be recognized.

In a word, the educated, intelligent and successful practitioner of dentistry needs to know, not only that teeth do decay, but the nature and source of the solvent and its antidotes.

He needs to know, not only that certain vices of conformation predispose to decay, but the causes of such malformations, the possibility of anticipating them, and the best method of protecting them when they exist.

He needs to know, not only that certain systemic conditions vitiate the secretions, but through what functional derangement they are engendered, and whether they can be corrected or anticipated and their influence modified.

He needs to know, not only that the tooth has a recuperative

power, but at what age it is active, how it protects the tooth, and what systemic conditions favor and what annul or abort its influence.

These things he needs to know so that he may work intelligently, with pleasure to himself, with profit to his patients, and with the most economical expenditure of nervous energy for both patient and operator.

1 IMPLANTATION SURGICALLY CONSIDERED.

RODRIGUES OTTOLENGUI, M.D.S., NEW YORK.

Whether the operation of implantation be destined to abandonment when we are enabled, if ever, to form a final judgment, or whether it will become a recognized practice, is not here to be discussed. In either case, it is however of much importance at present to those who undertake it, to possess a thorough knowledge of the anatomy of the maxillæ. To the inexperienced, who attempt to operate without such knowledge, there is a danger which cannot be overestimated. It is to be borne in mind that vessels are only approximately constant in their positions in the body. surgeon cutting through soft tissues, is warned by his sense of touch, if he approaches a vessel slightly out of the expected position. With us, who drill into a bone, however, the conditions are different. In the superior maxilla the vessels do not pass through special channels, but readily penetrate the spongy bone. In the inferior maxilla where the vessels are larger, there is, except in the incisive region, a special canal. This canal, however, has no dense wall which might give us warning, but is formed simply by a slight condensation of the bone, and retains in a marked degree the spongy appearance. The positions of the nares and antrum should be thoroughly appreciated. In order to gain a full insight into these matters. I obtained a number of bones, made sections in various directions, and what I learned from these and actual operations in the mouth, are the sources from which I draw the conclusions arrived at in this paper.

¹ Read before the Odontological Society of Pennsylvania, February 2nd, 1889.

In an article on Replantation in the American System (Vol. II. page 372), Dr. Weld makes this statement: "Some practitioners have been in the habit of washing out the socket, and immersing the tooth in a solution of carbolic acid. There is no objection to this plan, provided the solution be not too strong, not exceeding 4 or 5 per cent. But as antiseptic measures are hardly required in such operations, there is no particular reason for commending them." I introduce this here without further comment than to say that Dr. Weld, at one time an enthusiast on the subject of replanting roots and teeth, finally reported failure in a large majority of his cases, after a time varying from a few months to five or six years.

It is my purpose to consider the subject in strict adherence to its title, and I shall describe the operation as I deem it should be performed.

The patient having consented to the operation, the surgeon should first thoroughly wash his hands and clean his nails. I deem this of so much importance that I shall tell how to do it. A basin of water should have about three drops of ammonia added, and the hands should be steeped in this for at least one minute, and then thoroughly scrubbed with a hard brush, using eastile or glycerine soap. The hands thus relieved of the main portion of stains and dirt, and the nails cleansed whilst still softened by the warm water, should nevertheless undergo a second washing and scrubbing exactly similar to the first, except that a hot solution of hydronapthol and water should be substituted for the ammonia water. Anyone who has not given the hands a treatment similar to this will be surprised and pleased at the result. In drying the hands a fresh clean towel should be used. Of course the assistant should pursue the same method. Next, as to instruments. It is not necessary or advisable to place expensive instruments within the destructive influence of bichloride of mercury. A glass finger-bowl may be partly filled with hot water, and into this a tablet of hydronapthol thrown, producing a saturated solution (1-300), and into this all the instruments to be used should be placed and kept during the procedure, without fear, as this agent is germicidal in a solution one-tenth as powerful, and is non-corrosive. Into the same bowl I place small pieces of sponge, which I use for cleaning the socket of bone chips. a fresh piece being taken each time. In passing, I would suggest that it would be well for the bowl to be of a deep blue or red color, as the instruments thrown in during the operation dye the water, and render it unsightly to a patient of delicate nerves. For the same reason a spittoon should be used which conceals its contents,

and should be cleansed as soon as the actual operation is over, that neither the sight nor the odor of the blood may be present. The napkins should be renewed frequently, clean ones replacing those which become stained. Strict attention to these seemingly trifling details does much to mitigate the shock of the patient.

As an anesthetic before making the incision through the gums, I use an ether spray. To those who at this moment are thinking of "sloughing" as an attendant evil of this method, I will say I have used the spray for minor operations about the mouth, opening abscesses, removing necrosed tissues, etc., and have never seen any ill result. I think this due to the fact that the spray is not pressed to the point where actual freezing occurs. With the Rollins tubular knife a circular incision is quickly and painlessly made, and the tissue thus isolated is dissected away with a bistoury. Next, the the socket must be formed. For this no anesthetic is needed. I use instruments of my own pattern for this purpose. I have ten different sizes, which enable me to choose with reference to the diameter of the root of the tooth to be inserted. Two sizes will be found necessary, the smaller, to drill the socket the required depth. and a larger, to ream the upper portion to fit the root. If the larger reamer is a trifle smaller than the diameter at the toothneck, the socket may be formed so that the tooth when placed will fit tightly. I have so placed teeth, and seen them worn with comfort, and become fixed without splint or ligature. It is safer, however, to use a splint or retaining fixture of some kind, as the teeth frequently loosen in a few days, though firmly placed at the time of the operation.

Special precautions are to be observed in forming the sockets in every case, as follows:

FIRST—THE CENTRAL INCISORS, SUPERIOR.

A section through the center of the socket of the central incisor in the upper bone shows that the floor of the nares (the inferior meatus), is not far distant, whilst just back of the palatal wall of the socket, and towards the median line is found a canal of considerable size—the anterior palatal canal. Danger of entering the nares is present in two conditions: First, where a tooth, whose root is too long, is used; and second, where there has been considerable absorption after extraction. In choosing teeth, the fact that a tooth in the hand has a crown which matches in size the similar tooth still in the mouth, should, by no means, be taken as evidence that the length of the roots are equal. In development of teeth,

the length of their roots is in relation to the depth of the alveolar processes, whereas the width and length of the crowns may more probably depend on the space they must occupy in the arch. Hereditary influences also play an important part. The length of a root cannot be guessed at by the crown. In determining, then, the length, which would be safe, several points may be taken into consideration: First, observe the gum as to whether recession has occurred. If so, a tooth with a slightly longer crown than that of the one next the space, must be chosen, and the root should be just so much shorter. If the lip is turned up, a digital examination will frequently disclose the end of the neighboring tooth and measurement made. If this cannot be done, the line of union between the lip and gums may be considered a point beyond which it is unsafe to drill. In relation to the palatal canal, the direction is an angle slightly greater than the slant of the centrals in position. Generally these two canals are quite close together, or united at the junction of the two bones; but in some specimens, especially from young persons, they are larger and more widely separated. There is a condition frequently seen where a space exists between the central incisors, the frænum continuing down on the gum as a wellmarked ridge, ending in a little pedicle, which drops between the teeth. If one or both of these teeth should be lost, and the patient desires implantation, no attempt should be made to fill the space by making the socket (or sockets) near the median line. Such a course would surely result in entering the canal and rupturing the vessels, for the canals are widely separated in this somewhat abnormal condition. Great care should be observed with children -I have inserted a tooth for a boy ten years old to replace one lost by an accident -because the canals are very large at the age of five, being about double the adult. I have seen askull, with the tempory teeth still in situ, where the foramina of these canals were three sixteenths of an inch in diameter. The mere sight of that bone would make an operator redouble his precautions in future operations.

SECOND-THE LATERAL INCISOR.

In drilling a socket for a lateral incisor, the operation is in less dangerous territory, the distance to the nares being greater, and no large vessels being near. There is, however, one point which it is well to remember, viz., that extreme care should be taken not to drill through the alveolus at the extremity of the socket at the palatal aspect, thus wounding the soft tissue which covers the roof of

the mouth. Of course this is an accident to be avoided in all instances, yet I think there is special need for caution with this particular tooth, because whilst I have no proof I have abundant evidence which tends to indicate that an idiopathic tendency to pathological disturbance exists in this specific region. This of course is dogmatic, but caution is never hurtful. In the absence of direct proof, I will simply ask if the gentlemen present have not noticed the more than proportionate frequency of alveolar abscesses in connection with this tooth, and the stubborn persistency of the disturbance when once present; the rarity of success in efforts to conserve even slightly exposed pulps, and the rapid inflammatory action and loosening of the teeth after the death of the pulp? In my own experience I have seven times observed a detachment of the soft tissues from the palate process by the burrowing of pus, in three instances in defiance of the fact that fistulæ existed at the labial aspect of the alveolus. In another instance, almost the entire palatal process was destroyed as far as the median line, by solution of the lime salts from the bone. And in yet another a similar condition of less extent was reported by a brother dentist, in which case apparent restoration to health would result from treatment, the discharge of pus recurring persistently, however, for ten months at each menstrual period. It may be entirely a coincidence, but these nine cases were all in connection with the lateral incisors.

THIRD-THE CUSPIDS.

The cuspid socket normally is immediately under the apex of a triangle of which the wall of the antrum forms one side and that of the nares the other. The distance between the socket and the roof of the mouth is also greater here. A glance at sections of the bone, whether made through the socket towards the palate, or through all the sockets of the bone, shows plainly that this is the safest region for the operation. A point of interest, however, not to be overlooked is the fact that in this territory only do we find vessels of sufficient size to require special canals. I have found canals, two in number immediately over the apex of this socket, and nowhere else in the bone. They are short, however, and cannot be followed far with a bristle. The nerve comes down from the region of the antrum, and immediately over this tooth divides into anterior and posterior dental. In selecting teeth for this part of the mouth we should not choose too long a root, for in making a socket sufficiently deep we might wound one of these nerves, as I am sure I did on one occasion, producing a neuralgia which persisted

twenty-four hours, and disappeared only on the exhibition of antipyrine in large doses. An arteriole might be met here, which if injured would, in one of hemorrhagic diathesis, produce unpleasant, if not serious results.

FOURTH-THE BICUSPIDS.

These teeth may be considered together, for the antrum, the point of danger, is sufficiently near in many cases even to the first bicuspid, to make the precaution which should be observed in making sockets for the second bicuspid equally necessary in cases where the operation is for the first. The bicuspids are the teeth we are most frequently called upon to insert, and are also the ones offering the greatest danger of accident. It frequently occurs that, though the adjoining teeth are still in position, the absorption of the alveolus is so great that if the original tooth could be found and replaced, a considerable portion of the neck of the tooth would be exposed. When it is remembered that this loss of tissue shortens the distance to the antrum, originally none too great, the selection of a tooth to occupy this place becomes an important consideration requiring mature judgment. As it is claimed to be impossible to judge of the root of a tooth by its crown, so, also, is it equally difficult to locate exactly an antrum by examination of different skulls. The cavity is most variable in size, being sometimes large in small bones and small in large bones. There is, however, a comparatively safe course to take in the diagnosis, and that is, that the antrum has the largest possible dimensions. This would mean that the floor extended over the entire molar and bicuspid region, the lowest point being over the second bicuspid. The landmarks and their value are as follows: The junction of the cheek and the gum is usually on a level with the floor of the antrum. The molar process, easily discoverable by a digital exploration, forms one floor of the antrum, though not the lowest; the extreme base of this prominence may be taken as a point beyond which it would be unsafe to drill, and measurement may be made accordingly.

In performing the operation the patient should be tipped back so that the height of the roof of the mouth may be well considered, as also the width of the process; this latter point will give an idea as to how much towards the palate the drilling instrument may be deflected in order to avoid the antrum, which is mainly in the buccal portion of the bone, but in this effort to avoid one danger another should not be overlooked; in so slanting the instrument there is a chance of

entering the nares, especially in the case of the first bicuspid. It should be borne in mind that should either of these cavities be entered and a tooth implanted notwithstanding, as has been advised by good operators, diagnosis would be difficult should any after-trouble occur. In either case a discharge would find its way into the fauces, dripping from behind the velum. One more point. and then I shall relate an incident which will emphasize the fact that these precautions are worthy of note. After a tooth is extracted, the socket is usually filled with a deposit of new bone. It becomes a question of importance whether this bone be dense or not. In some, and perhaps the majority of cases, the new bone is about the same as the surrounding parts. In other cases, however, and these are the ones fraught with special danger, when working under an antrum, the socket is filled with bone abnormally vascular in character, the surface, however, being a dense, hard layer. In operating in such a case, the outer and denser layer would offer such resistance that great force would be required to penetrate it, and this accomplished, were the operator not prepared against accident, the instrument would rush forward through the less resistant spongy portion. In order to exemplify this, and to disprove the assertion made by a skillful operator in a paper read last summer, to the effect that no serious consequences might be expected from entering the antrum, I will insert here the history of a case in which occurred most untoward results.

At the clinic before the First District Society of New York. last winter, I implanted a first bicuspid for a lady patient. I found the bone at the surface very resistant. I was using the Walker-Younger trephine, and had the little collar set to indicate the depth to which I had decided it would be safe to drill. I wish to emphasize the fact that it was for a first biscupid for which I was preparing a socket. I exerted considerable pressure in entering the bone and was, nevertheless, progressing slowly, when suddenly, to my amazemet and dismay, my instrument plunged forward, entering the bone beyond the depth marked by my collar, and became so wedged that my engine was stopped. I had considerable difficulty in withdrawing the trephine, and a flood of blood followed. A spittoon was furnished, but my patient continued ejecting blood so long, that I brought her head back into position and attempted to wash the parts for an examination. This was done with difficulty, as the flow of blood was quite continuous. At last, however, it was staunched sufficiently by packing the cavity with cotton, so that the mouth and face could be washed, and then, on withdrawing

the packing, as the flow began again, the nature of it was determinable, and from the distinct pumping, I concluded that it came from an arteriole. I again packed the cavity, as the flow threatened to be great, and with a careless word to those about me, none of whom suspected the gravity of the situation, knowing neither that the antrum had possibly been entered, nor that a vessel had been lacerated, I whispered a word of encouragement to my patient, and turned away to seek advice from friends present. One of great experience returned with me, and watched the flow as I removed the packing a second time. He advised the rapid completion of the operation and setting of the tooth in spite of the hemorrhage, which was really alarming. In deference to this advice, I finished my operation rapidly and placed the tooth in position, procuring a fine adaption and perfect occlusion, and winning encomiums from all present, except myself. I received the applause accorded me with a heavy heart and a sore conscience. Fortunately for me, the patient was my own sister, and would be under my constant observation. Before placing the tooth finally, I essayed to probe the socket, in order to determine whether the antrum had really been penetrated. I could find no opening, but touched a point which was so very sensative, that I had little doubt that it was a nerve. The exploration also brought a recurrence of the hemorrhage, and for this reason was not thorough.

The first night an increasing pain was present, reaching such a point by midnight, that I deemed it best to administer twenty grains of chloral, which, from an acquaintance with the idiosyncracies of the patient, I knew to be the safest remedy. This brought sleep in about one hour, and she reported at my office the following afternoon. At that time the pain still persisted, and she complained of a slight but constant trickling of blood in the throat. An odor of blood also began to be noticeable. That night sleep was obtained without recourse to narcotics, and my own mind became somewhat relieved.

On the third day the patient reported at my office in the morning. Locally all seemed progressing well; but the dropping of clotted blood from behind the soft palate was still present, and the odor had so much increased that a spray of carbolized water was used, and directions given that it be kept up during the day. The neuralgic pain from the lacerated nerve still continued, and antipyrine was ordered in doses of five grains every hour. As the patient seemed cheerful, I kept an engagement previously made for that evening, and did not reach my home in Brooklyn till midnight.

I found my sister awake and anxiously awaiting me. The dripping into the fauces had become purulent to a slight degree, and though the antiseptic spray had been strictly adhered to during the day, the oral cavity emitted an odor disgusting even to the patient. She was in a high fever, the temperature being 102°, and the pulse 100, the normal pulse in her case being as low as 70. This fever continued, notwithstanding the administration of the antipyrine, which had produced no salutary effect whatever, the pain having greatly increased. Under the circumstances I deemed it best to remove the tooth, which was done gently with the fingers. The immediate result was a great intensification of the pain; but chloral produced sleep in about three quarters of an hour.

We arose about seven o'clock the next day, and called on a throat specialist. My intention in so doing was to have him make an examination, in order if possible to discover whether the dripping into the throat came from the antrum or the nares. I remembered that, in order to accommodate the occlusion, I had slanted my trephine towards the latter cavity. We reached the office of my friend before he had arisen, and whilst awaiting him, my sister lay on the lounge. In about five minutes she arose, saying that blood was coming from the socket. I at once took her into the office, and sent a messenger to hasten the doctor, as I knew not where he kept his appliances. This secondary hemorrhage assumed the most alarming proportions, the flow being continuous for half an hour, in spite of our efforts to control it, which was finally accomplished by packing the socket and then forming a roll of cotton on which she could bite, thus making a compress. The actual flow having ceased, we allowed her to rest on a lounge, whilst the doctor attended to his patients, who began to arrive. For two hours, in spite of the packing and the compress, sufficient blood oozed through the dressings so as to make the presence of a spittoon necessary.

At the end of three hours we returned to the specialist's office. Cocaine was applied to the nose and the cavity dilated. A thorough examination was made, both ocularly and with instruments; but no evidence that the discharge came from the antrum was obtainable. Instruments wrapped with cotton could be passed through the passage and withdrawn free from any stain of blood. So long as the hemorrhage had continued the dripping into the throat had ceased, as also had the pain; both had recurred with the packing of the cavity. All the unpleasant symptoms continued during the day. The spray was changed to one of listerine, as being less dangerous to the mucous membrane;

the packing in the socket was left in place, and specially sprayed to keep down the offensive odor.

On the morning of the sixth day (two days later), the patient awoke to find that the packing had slipped out of the socket during the night, and as the hemorrhage had not recurred it was left out. That afternoon she was able to come to the office, having been confined to bed for two days, suffering from nervous prostration and pain. As the discharge into the throat was now distinctly pus, in spite of the danger of renewing the hemorrhage, a gold probe was passed into the socket, in the hope of determining whether the antrum was involved. The probe passed into the antrum unobstructed, and all doubt was dispelled. No serious result followed this probing, although slight hemorrhage occurred that night, which the patient herself readily controlled by packing the socket.

The question arose as to what was the best method of procedure, and in this affair I felt myself irresponsible, the nervous strain on myself and sleepless nights having completely unmanned me; I therefore called in a friend in consultation, and we discussed the propriety of placing a tampon in the opening to the antrum, so that that cavity might be thoroughly washed out. We determined that this would greatly aggravate the pain and delay the healing; that so long as the cavity was being emptied by the dripping behind the soft palate, the danger of septicemia would be absent, and therefore such heroic treatment not indicated. The course decided on was to use antiseptic sprays in the mouth and nares, and wait. If the dripping should cease and the temperature rise coincidently, interference would then become necessary.

This treatment was followed, and a cure effected. The pain, however, continued for fifteen days after the operation, the dripping of pus continuing for thirty days, and a complete restoration occurring in about five weeks.

Undoubtedly the hemorrhagic diathesis in this case contributed greatly to the disastrous results of what, after all, was but a simple wound. There could scarcely be an accusation of septic taint, as the strictest germicidal treatment has always prevailed in my operations. It was only the eighth day after the operation that I was, by appointment, to give a clinic at Newburgh, and my feelings during the operation may be imagined. The case was the implantation of two central incisors, in a space much too wide, and the dentists about me endeavored to persuade me to close up the space at the median line. I had too lately had an experience of hemorrhage, however, to approach the palatal canal, and set the teeth, as

the original ones had been, with a space. I think the relation of this case should tend to make operators careful, especially where there is a predisposition to hemorrhage.

FIFTH-THE MOLARS.

Of molars there is little to say. The usual precautions are necessary, especially as to the antrum. I generally use wisdom teeth which have a single root, or convergent roots, or possibly a lower molar, but never a three-rooted tooth. I make a single socket, not a socket for each root.

In the lower jaw, all the general and a few special precautions are necessary. The point of danger is the presence of the dental vessels, which occupy a large canal, the locality of which should be specifically known. A section through the centers of the sockets, which removes the lingual portion of the bone, discloses the fact that the dental canal would thus be reached only in the bicuspid region. A section, however, which removes the buccal portion exposes the entire canal. The point of moment to be gathered from this is, that the canal exactly underlies the teeth only in the bicuspid region; in the molar region it curves outward, and occupies a position in the swell of the bone. Between the bicuspids the canal divides, one branch curving outward, reaching the surface at the mental foramen; the other continues, but is no longer a definite canal when the cuspid is passed.

FIRST-THE INCISORS.

The incisive region, in the lower jaw, is comparatively safe. It must be remembered, however, that whilst there is little danger to be apprehended from drilling deeply, much care must be exercised in lateral reaming, as the alveolus is narrow, and, here as elsewhere, the aim should be to surround the implanted tooth with bony rather than with soft tissues. The amount of tissue lost from absorption, caused by salivary calculus, should be carefully estimated in deciding the depth to which the drill may be carried. In fact, the aim should always be to carry an artificial socket no deeper than was the original one.

SECOND-CUSPIDS.

Under the cupsids be it remembered, the dental canal, though smaller than elsewhere, is nevertheless distinct.

THIRD-BICUSPIDS.

In connection with these teeth it should be borne in mind that the main canal is immediately beneath the original sockets, and that a branch passes between them. A socket for a first bicupsid should be drilled towards the cupsid, and one for the second should be directed towards the molar. The depth to which the drill may be carried should be most carefully calculated.

FOURTH-MOLARS.

It having been shown that the canal, quite large in this vicinity, curves outward towards the cheek; it would be safer to slant the drilling instrument lingually, rather than straight down or outward.

In passing this aspect of the subject, a few more cautions may be noteworthy. I can conceive of no condition where it would not be reprehensible to endeavor to implant a third molar, especially in the superior jaw where there would be danger of wounding the artery which passes around the condyle, the superior dental, or the descending palatine, within the posterior dental canal.

The arteries which supply the teeth are larger in the lower than in the upper jaw. In the latter, within the bone itself, are the inferior dental which, under the bicuspids divides, the mental passing out at the foramen, and the incisor continuing under the anterior teeth, till it anastomoses with its fellow. In the superior maxilla it is otherwise in that the branches of the superior dental, which enter the foramina of the bone to supply the teeth, are too small to be given distinctive names, but are still large enough to make considerable hemorrhage possible, as has been related. We do not trace back far before we reach important vessels, the superior dental being a branch of the alveolar, which is given off by the internal maxillary, the most important branch of the external carotid.

Absorption in the lower jaw is usually so great, that the original distance between the dental canal and the surface of the bone is materially lessened. Except where but one tooth is absent it would be imprudent to operate without special consideration of this fact. For example, suppose a case where the bicuspids and molars have been lost on one side; the implantation of a molar would render a bridge possible; but where so many teeth had been lost it would be very improbable that sufficient alveolar process would be remaining above the canal to render the operation possible. If such a bone be examined, even the mental foramen will be seen to be almost at the surface.

The socket made, it remains to place the tooth in position. Before this is done, all bone chips should be thoroughly removed,

pieces of sponge being used; one piece saturated with hydronapthol solution being left in the socket, whilst the operator once more thoroughly washes his hands and sterilizes them. In the final placing, the fingers which insert the tooth, and the tooth itself should be wet with the potassio mercuric iodide solution. A piece of orange wood and a few taps of a mallet may be used on occasions to set the teeth home.

I prefer the splint to the ligature for retaining. A permanent splint is made of gold, swedged to form a continuous crown and backing over three teeth including the implanted one. This is fastened with oxy-phosphate. A removable splint is made of vulcanite and covers the roof and passes over the cutting edges of three teeth as before. This worn continuously at first is, after a while, worn only at night, to prevent accident during sleep. In cases where the patient can be seen often the latter splint will be found preferable. Impressions for these are made with plaster immediately on completion of the operation. The plaster is watched closely and removed in such a way as to fracture at the cutting edges, leaving the portion which covers the face of the teeth and the gums, to be removed afterwards. If done carefully there need be no fear of disturbing the tooth implanted.

CLINICAL LECTURE.

BY JAMES GARRETSON, A. M., M. D.

ESPECIALLY REPORTED FOR THE INTERNATIONAL.

Gentlemen:—Last week I brought before you this little child with the intention of performing on it the operation for fissure of the soft palate, but on finding that the child was somewhat unwell I sent it back into the wards till to-day. In the performance of this operation we need all possible favorable circumstances, and indeed even then I never approach it without trepidation, and doubt as to whether I do wisely. In fact the successes are so few that I am inclined to think it best in every case to use an obturator. After a little instruction and with an ordinary amount of skill any one can make an instrument of this character. Of course every dentist knows how to make an obturator; but this same knowledge may sometimes prove of great value to the physician. With some properly prepared wax first take an impression of the roof of the mouth. Perhaps you will say that I am old fogyish to make use of

wax for such a purpose in this advanced age; but when for many years I have found a certain thing give satisfaction I am loath to give it up. Use plaster, if you choose, but as for me I shall continue with the wax. After having taken the impression, there will be a nodule on the wax corresponding to the fissure in the palate. This nodule can either be removed now, or after the plaster cast is taken, the corresponding depression in the cast can be filled with wax and smoothed with the finger. But this case we intend to treat surgically, and as the little patient is well under the influence of ether, I now proceed to freshen the surfaces we desire to oppose by cutting a small section from either side of the V-shaped fissure. This performance is easy enough, and though stitching the freshened edges together in the back of a baby's mouth is by no means so easy, it can be done, as you have just seen. But this is not the trouble. After having finished the operation, the surgeon may be pleased and inclined to congratulate himself on his success. The following day he will still be pleased, and so the next, and yet the the next. But on the day after that, upon looking into the mouth, he will probably notice that every one of those stitches placed with so much care is beginning to slough out, and will continue to slough in spite of the utmost efforts, until the parts are separated as widely as they were in the first place. I remember that some years ago I was surprised frequently to read in the English journals the remarkably good results in the cleft palate operations performed by Mr. Ferguson. As one of my assistants chanced to be going to England at that time, I asked him to make careful inquiries into the matter, and discover why our results compared so poorly. He did so, spending some months at Mr. Ferguson's clinics, and found that the percentage of real successes was not a whit more than our own; but that the accounts had mainly been published soon after the operation, before the final result could be known, and while everything was yet going smoothly.

LEUCOPLAKIA BUCCALIS.

Here is a case of leucoplakia buccalis in a man of some forty-seven years of age, whom I have had before you several times within the last year.

This is a peculiar disease; you might almost say an anomalous one, and one that occupies, I believe, the borderland between malignant and non-malignant growths. Some call it ichthyosis of the mouth, some psoriasis, some eczema; others, other names. This diversity of naming is chiefly because the malady is so obscure,

and in different instances simulates the appearances of those different affections. I call it leucoplakia buccalis, because its chief manifestation is that of white plaques or patches on the inner buccal surface. In the course of my specialty as an oral surgeon I have seen more cases of this trouble than fall to the lot of ordinary surgeons, and I have learned by experience, by sad experience, the folly and the harm of using radical measures; of trying to burn out the affected part with caustics. It is like striking with a wand a sleeping, hungry tiger. The hitherto quiescent and sluggish spot takes upon itself a swift and terrible growth. The temptation is now to use more caustics, and the effect is simply to spur on the disease, now truly malignant, to increased efforts at sapping the patient's life. This is a malady which beautifully illustrates our maxim of "when you know not what to do, do nothing."

There are few people, though, who having a certain trouble will submit to a course of doing nothing; but if I had this case of leucoplakia buccalis in my own mouth, I should follow the same treatment which I have advised this man to pursue—simply to use a wash of subnitrate of bismuth.

By acting on this advice the patient may live as long as any of us, and finally come to his end from some other cause; but if he allows the parts to be tormented by caustics, the course of his life will be suddenly and sadly changed.

I will now look into his mouth to see what condition we have at present. You may think I ought almost be ashamed, after dilating on the dangerous character of the disease, when I say that it looks almost well. Still I see a white line, a faint white line, extending from opposite the third lower molar to the malar process. Probably you would call it most insignificant; but it is the white line. Some may wonder why I do not cut it out. I have tried that, but it was before I fully comprehended the condition and when I was without any guide from the practice of others. I cut away, and cut away, and it would have been better for the patient had I been a thousand miles distant.

So I shall counsel this patient to continue the same treatment, reporting to us from time to time; and I advise you, when you see the white line, whatever you may call it, ichthyosis, leucoplakia, psoriasis, or eczema, let it alone.

OSTEO-ODONTOMA.

Our last case is one of most peculiar interest; for it is not only wholly unique in my own experience, but I know of only one similar

case that has been reported in all literature. That case is given fully in my system of Oral Surgery, as an abstract from a report by M. Fourget to the Royal Academy, together with a prize essay thereon. The two cases are so surprisingly similar that, if you will read the account referred to, you will have the characteristics of this. The patient is a young man of twenty-one, and according to his own account his history is as follows: With regard to dentition, he remembers nothing about his milk teeth; but as to the permanent set, he is certain that the two left lower bicuspids never made an appearance. The left side of the inferior maxilla has always been fully three times as large as the other side, showing that the tumor was congenital; and the enlargement grew in about the same relation to the right, giving him no particular inconvenience till a year and a half ago. At that time there appeared a sinus at the base of the left first molar from which pus continually exuded, and in addition there was swelling and other marked inflammatory symptoms about the jaw. Under the belief that the pus came from an abscess in the first molar, the patient's dentist tried to pull the tooth, but succeeded only in breaking it off. Pus continued to discharge and increase, till finally he went to a hospital in Boston, where they made an incision under the edge of the jaw, extending some six inches to the left of the median line, and removed, he says, a piece of bone as large as an English walnut. Before the operation, which was performed, October, 1888, he could separate his teeth not more than one-eighth of an inch on account of the great swelling in the submaxillary region. This part of the trouble was remedied by the operation, but the main tumor still was there, and pus exuded as before.

His dentist then advised him to consult with me.

Upon first making an examination, I thought I had to deal simply with a case of necrosis of the lower jaw; for on the left side could be seen a large and apparently spongy mass, from which oozed an offensive discharge. But the probe soon disclosed the fact that we had something entirely different and more formidable to treat. On all sides a solid bony mass was felt, and the sharp burr of the powerful surgical engine found a surface as hard and as smooth as a billiard ball. The former way of treating a case like this would have been to make an incision along the under border of the lower jaw, dissect up the flap, and remove the entire half of the jaw. This is a quick and easy method, but our surgical engine will remove the tumor and yet leave the jaw there for both service and looks. We have operated on five different

occasions, because the patient will take no ether, and because of the slowness of our progress; but we expect to finish before you to-day. As the patient lay on the table at first, the size of the tumor could easily be seen. It reached down to a level with the upper border of the thyroid cartilage, was about three inches in diameter on its short axis, and extended from the median line to half way up the ramus of the jaw. Laterally considered, the left side of the face is about an inch and a half wider than the right. The pus would seem to have been developed by the effort of nature to throw off an offending foreign body, and as for the composition of the tumor, it consists of a heterogeneous mass of bone, and of dentinal tissues, containing in its substance at least one partly formed tooth, the deciduous lateral incisor, and altogether having a formation strikingly similar to the singular case related by M. Fourget.

Reports of Society Meetings.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE REGULAR MEETING OF THE ODONTOLOGICAL SOCIETY OF PENNSYLVANIA, WAS HELD SATURDAY EVENING, MARCH 2, 1889, IN THE

ROOMS, ARCH AND THIRTEENTH STREETS.

President Kirk in the chair.

DISCUSSION OF DR. PEIRCE'S PAPER.

Dr. Sudduth—I have listened to the paper with much pleasure but shall have to take exception to several statements of the essayist in regard to caries. The first is in regard to the recuperative power of the teeth. I think there is no question in the minds of active workers, that the tooth is a passive agent in the process of decay, and that the only resistance offered by it, finds its expression in the pulp cavity. The office of the pulp is that of a formative organ, and when irritation, either by abrasion or chemical disintegration, occurs to the distal ends of the fibres, the irritation is transmitted to the odontoblastic layer, and as a result of such irritation, we have secondary dentine developed; which, so far as we have been able to demonstrate, is the only resistive action shown by the tooth in the process of decay.

I use the term decay as opposed to the term caries. In my experience I have never seen decay of cementum in the same

manner as we have decay occurring in the enamel and dentine of the exposed portion of the teeth. The breaking down of the cemental portion, or root of the tooth, is analogous to caries in bone, and is carried on by the same process, viz., Osteoclasts. We should distinguish between the terms caries and decay-decay, for that process which occurs in the exposed portion of the tooth, and caries for the roots of the teeth, and especially for the breaking down of the bony tissue. I have never seen decay occuring in the cementum. In cases of pockets forming around the teeth in pyorrhea alveolaris, it has been my experience, that there is almost never a breaking down of the roots of the tooth, in the same manner that we find in the crown of the tooth. That absence from destruction has been a marked feature in influencing my deduction, in regard to the difference between the two processes. Dr. Peirce also spoke in regard to decay's being more active in youth than in advanced age. There are two or three clinical phases of the question, which I have not been able to settle in my own mind. I have not had the same experience in years of practice that many of you have had, and consequently I do not feel justified in saving anything definitely in regard to this one point, yet I would offer this suggestion in regard to it, that if such is the case that caries is more prevalent, in youth than in mature life, the solution to the question will be found in that these teeth, being erupted in a poorly calcified condition, are broken down by the first result of the fermentative process, and therefore pass out of the way first—we have remaining only the strong teeth in after life, whereas, the weak teeth have disappeared in youth.

It seems to me that we know sufficiently regarding the process of decay to say positively that decay does not occur through the general acid condition of the saliva. Erosion may be the result of that condition, but decay, as we know it, which is the breaking down of tooth structure first, by decalcification, and secondly, by the disintegrating process that takes out the basis substance, is due to something else than the acid condition of the saliva, and these old acid and other theories must be done away with, and give place to later ones.

Another point I noticed made by Dr. Peirce, was that of the periodicity of decay; during certain times of life, in youth or middle life we have a greater amount of decay than at other times. That an overtaxed condition of the system, has anything to do with the condition of the tooth itself as a resisting agent in the matter, I cannot admit for a minute, yet periodicity may be due to a certain action, which

we have not yet fathomed. I have noticed it in my own case; but why it occurs I cannot say. It may be that at these times the patient gives less care to the teeth than at other times.

The, so called, exciting cause, abnormal conditions in secretions, mentioned by the essayist, has been answered in the statement that the secretions themselves, except in a very few instances, can not be said to give rise to the breaking down of tooth structure. You may have erosion at the gingival margin, but that is not decay. It is a different kind of process, and should come under the class of erosion rather than decay. We are positive that acids will not cause decay in teeth. They break down enamel and dissolve out the lime salts of the teeth; but the form of the den tine will remain the same. We must have something else besides acids. We must have a digestive ferment, and the only factors that will develop it are the micro-organisms found in the oral cavity. The germs are the exciting causes; others things are only accessory.

A perfectly sound isolated tooth, without a break in its continuity, will never decay. Micro-organisms cannot enter the tubuli unless the dentine is first decalcified. It is only when decalcification has taken place that they can enter and find a place to work. They must be in an enclosed cavity, and that is why we do not have decay in the pockets that form around the roots of teeth in pyorrhea alveolaris; the saliva enters freely and dilutes the acids produced by the micro-organisms at that point. The predisposing causes are, first, malformations with poorly calcified sulci; second, irregularities which give rise to pockets where micro-organisms can collect; and, third, abrasion, which is seldom a predisposing cause. The exciting cause in decay, which I would confine to the crowns or the exposed portion of the teeth is, beyond question, microbes, and the predisposing causes are malformations.

The paper was an excellent one, and the points to which attention was called, regarding the conditions which predispose to poorly developed teeth, were well taken. It was a presentment we can all learn from, and the only exception I take, is in regard to the active agents in the causation of decay, and the distinction between caries and decay, and that the tooth is a passive and not an active agent in the process.

Dr. Faught—I was very much pleased with the paper and with the practical aspect of it. I think it sets forth some of the causes of decay. I emphasize the expression practical, because we all recognize the periodicity of decay, tendency and heredity are undoubtedly factors in certain conditions of the system other than

the teeth, and must undoubtedly be considered in the question of combating caries. If caries be the result of acids breaking down the enamel, or of germs entering and disintegrating the dentine, then after we have placed the teeth in proper hygienic condition, we might be assured of the permanency of our work. But such is not the case, for with our patients constantly under our care, seeing them at near intervals, knowing them to be cleanly and to use the proper means to secure this end, even then we meet with recurrent caries; and whether it is a factor or not, we know of concomitant lowered nerve tone in the patient, and of which we believe the fluctuations make constant demands upon us for renewed effort to protect the teeth. This fact I want to emphasize, for I believe that one of our worst enemies is the nervous influences on decay. When lowered, caries progress rapidly and is of frequent occurrence: when normal, we find the teeth do not need so much care.

Dr. Sudduth—I would like to ask Dr. Faught a word in regard to lowered nerve tone. Might it not be that patients, owing to this condition, come to us with their mouths in a less cleanly state?

Dr. Faught—I think not. I try to impress upon my patients the necessity of oral hygiene. I take entire charge of their mouths, sending for them when I deem they need attention. They are patients who are very careful in all matters of cleanliness. They would not neglect it on account of lowered nervous tone. I find it invariably the case that in many instances we can trace the progress of caries and fix it upon nervous conditions. I speak of one lady in particular who passed through great trouble and her teeth began immediately to break down. She then had new conditions of life put upon her, and I saw that the teeth responded. Seeing so many of these cases which I care for, I must think that the question of nerve tone or nutrition in some way has decided influence upon dental caries.

Dr. James Truman—This is well-ploughed ground; but I am pleased that Prof. Peirce has responded to the request for a paper in the way he has. It is always satisfactory to get what I call an original idea, and I think I have received one to-night from the paper read, and that is: That, at the period of childhood, there is a deficiency of lime salts to meet all the requirements of the system; and that therefore decay progresses more rapidly. While it is true that teeth at this early age lack density, I question whether it is from a want of the constituent elements in the organization to supply them. That this

can have more than an indirect influence may be questioned; the direct being in the tendency to fermentation and acid products at that age, there being necessarily an increased tendency in this direction at this time. I think he made the statement that teeth are not destroyed, if I understand him correctly, by the secretions of the follicles.

Dr. Peirce—When there is tartar deposit in the mouth.

Dr. Truman—Then you accept glandular action in the matter of erosion?

Dr. Peirce—Yes.

Dr. Truman—There are two prominent points in the paper upon which I wish to enlarge. I cannot agree with Dr. Sudduth that the density of teeth has nothing to do with the action of caries. The condition of the teeth necessarily affects the progress of caries, the density acting as a constant barrier to the inroads of the disease.

Dr. Sudduth—Allow me to correct, if you please. I said that there were no lime salts thrown out except upon the surface of the pulp, and that is what protects it from the influence of decay.

Dr. Truman—I also take exception to that. In irritations that do not extend beyond certain limits, there is increased deposition of lime salts.

Dr. Sudduth—In the pulp cavity only.

Dr. Truman-You will find it in the tubes of the teeth. I am well aware that I am in opposition to many-Black, Wedl and even Tomes—on this subject. Nevertheless, my convictions are positive, that depositions occur in the tubuli of the teeth, and that in sufficient quantity to act decidedly against the progress of caries. These gentlemen will probably not deny that the fibres that penetrate the tubuli are prolongations of the pulp, and are hence part of that organ and subject to its conditions and its physiological changes. If therefore, secondary formations are possible in the main organ, independent of the odontoblastic layer, they are possible in the minutest branch. There can be no theoretical argument that will apply to one that will not apply to the other; hence I regard the transparent zone of Tomes as a possibility. Any other view of the subject seems to me to be antagonistic to fact and reasonable analogy. Dr. Sudduth made the remark, if I understood him, that there is no destruction without micro-organisms; that the secretions of the mouth never produce destruction.

Dr. Sudduth—Acids produce destruction on the free surfaces of the teeth—erosion—but not decay.

Dr. Truman—Then I have no quarrel with you on that point.

Dr. Sudduth-I have here, to-night, a section of ivory, in which a ball was imbedded, and in which this translucent zone shows very prettily between the eavity and the sound dentine. I would say in regard to this translucent zone, that I have taken sections of teeth where this transparent zone showed as prettily as it does in in this section, and reproduced the normal appearance by soaking them in ether. I have also taken the sections of teeth and put them in an imbedding mass of paraffin, melted, and produced this transparent zone, getting the same appearance. Dr. Miller admits that there is a possibility of error; yet the fact that we can take specimens, and by dissolving out by the use of ether or essential oils the fatty portions of the fiber, which I have no doubt are dissolved out, thus clearing up this translucent zone proves, to my mind at least, that this translucent zone is a product of the disintegration of the fibrils themselves, which always goes ahead of the process of decay. I have never been able to demonstate that there is any decalfication there.

Dr. Kirk—Before the subject is closed, I would like to ask a few questions. Dr. Peirce used the term, "recuperative power of the teeth." As I understand it, Dr. Peirce is talking about one thing and Dr. Sudduth seems to be talking of something else. Dr. Sudduth confines recuperative action to the pulp cavity. Dr. Peirce's term applies to increase of density in teeth, from a lower condition to one of greater density. I think the microscope is not the only means we have at our command of distinguishing this question. There are certain facts that, to my mind, the microscope has not explained.

Dr. Sudduth—In what portion of the tooth do you say this occurs; in the enamel or the dentine?

Dr. Kirk—In the dentine. I read a paper in 1881, called "The Tooth in Pregnancy." In this I noted the various stages of dentine while women were in this condition, finding that when they bore children there was a decided loss of density of tooth structure, but in which repair afterwards took place.

A patient came to me from the hands of a dentist who had the previous year inserted thirty fillings. That lady has been a patient of mine for eight or nine years, and in that time I have not inserted a half dozen fillings. It is not due to difference of ability, because I know the man who filled the teeth to be a good operator, and I attribute the difference in the quality of her teeth simply to re-

stored condition of health, and I know her teeth to-day are harder and denser than when I first saw her.

Regarding this matter of density I hold that a man whose fingers are educated, can tell the difference, and that his observation is just as good as though the microscope were used, whether he is cutting cheese or marble; and we have seen the periodicity of decay, with increase and decrease of density in tooth structure too often to be misled. What it may have to do with the question of the osteo-dentine, or secondary dentine, I do not know or care; but I wish to go on record as believing that tooth structure, which I will limit to dentine for the sake of argument, although I am not prepared to say it does not effect enamel—gets harder and stronger.

Another point. I do not quite understand the difference Dr. Sudduth makes between the terms decay and caries. It seems to me that they are perfectly convertible terms. He said that acids were not capable of causing decay of the teeth. He further says that all the acid does is to make a roughing of the enamel, which is followed up by the ingress of micro-organisms in that condition, which act as a fermentable substance, and he further states that fermentative action is the production of the microbes. It therefore seems to me that it is a localized action-localized because the micro-organisms are produced in one spot. They simply remove the lime salts from the tooth, and the gelatinous, or organic matter left becomes broken down. That is as I understand it. regard to this acidity which we observe in the mouths of children, and where erosion of the teeth take place at the neck, Dr. Peirce's idea does not explain it all, I think. It explains the relations of the teeth to an acid condition, but does not afford an explanation of why the acid condition exists. I believe it does exist in the period of childhood much more than it does later on-part from a lack of cleanliness, and my own explanation as to its cause, which is purely theoretical, is this: Where the tissues are rapidly growing—where any of the structures are rapidly growing, means an increased determination of blood to that part, and a condition of mucous membrane the same as we see brought about by a local vaso-motor disturbance. The effect on the mucous membrane at that time, is to produce an acid condition. The teeth, of course, being soft, and of a looser texture at that time are more rapidly acted upon.

I would like to ask Dr. Sudduth whether the teeth do not become denser through various periods of life, or having become dense, may not become less dense?

Dr. Sudduth-That goes into a question of chemistry, and one I think our president should himself answer. What we observe in the matter of density is the enamel, not dentine. The exposed covering of the teeth in the mouth is entirely enamel and the variations in density and softness relate more particularly to the enamel than to the dentine, and that is one reason why I asked the question of Dr. Kirk, whether it was the enamel or the dentine. We know that fermentation is a cause of decay, not a sequence. You cannot break down the substance of a tooth with an acid, You can decalcify bone, but you still have the form of the bone. The acid has simply taken out the lime salts. Caries is a process occurring in organic tissue in which the tissue itself plays an active part. Caries is confined to tissues that are buried in the soft tissues; whereas, decay occurs in the exposed portion, and is a process which originates outside the tooth itself, and in which the tooth plays a passive part. Decay is the result of microbic action. The free acid in the mouth causes erosion; but does not destroy the form. Decay destroys the form and is a process that occurs in organic tissue.

Dr. Kirk—I would like to ask if Dr. Sudduth believes that a tooth when once erupted remains the same all through life?

Dr. Sudduth—Certainly not. Calcification of the dentine at the time of eruption is not complete. It is only after a considerable time that the tooth becomes thorougly calcified. The enamel after the tooth is erupted, however, can change its density only from the saliva. When the tooth crupts the enamel is forever shut off from its original source of supply of lime salts, and the formative organ, the ameloblastic layer, becomes hornified and loses its function. Any change which takes place thereafter in the enamel is a chemical and not a vital action. The source of lime is then from the saliva and if there is any increase in the chemical constituency of the tissue, it is from without and not within.

Dr. Faught—I fear that my remarks have been misunderstood, they simply had this reference: If acids alone destroyed the tooth we should have comparatively good results as dentists in caring for the teeth. I do not believe this to be true, and even if we understood this matter thoroughly, I still believe we should have a world of trouble in preserving the teeth, as a result of conditions existing in the tooth and from the lowered nerve tone. I am not prepared to say how much is due to the one or to the other, but I believe clinically, that decay goes on and gives trouble on account of the lowered tone. If we only had the influences mentioned by Dr. Sudduth

we should have a good time caring for the teeth. I should like to believe that there is more or less fluctuation in the conditions of the enamel as well as the dentine.

Dr. C. N. Peirce—Dr. Sudduth instances a case of Pyorrhœa where the pockets are large and open, and, though the cementum on the roots of such teeth is constantly subjected to the influences of the saliva, yet he has never observed decay attacking the cementum of such roots. I should be obliged to Dr. Sudduth, or indeed to anyone, for a view of a case of progressing decay where calcic pyorrhœa is present. I have never seen dental caries or decay progressing, in any dental tissue, where pyorrhœa alveolaris was present. Therefore, the fact that cementum has not, under such circumstances decayed, is no reason for assuming that it will not, under more favorable conditions, become the seat of this disease.

Dr. Sudduth-Has Dr. Pierce seen decay in cementum?

Dr. Peirce—Yes. If Dr. Sudduth would like an illustration of cemental decay, I would refer him to the mesial or distal surfaces of bicuspids, or molars, where a partial set of teeth on rubber is worn, with the plate impinging upon these surfaces, so as to retain particles of food, or any fermentable substance, in contact therewith. I think, in the large majority of such cases, cemental decomposition will begin within six months after the insertion of such partial dentures.

Dr. Sudduth—The cement is so thin at that point that it could hardly be called decay, no pocket is formed in the cement.

Dr. Peirce—Regarding the resisting power of the tooth, my experience has been that it increases or diminishes with the modification of certain systemic conditions. It certainly is the result of observation, that teeth for months, and even years, have been gradually decomposing, and then through the influence of systemic change, decay entirely ceases—this having been preceded by a change in the oral secretions, which is also the result of constitutional or systemic conditions.

This retardation, or as is somtimes observed, the entire or complete arrest of dental decay, followed by a brown eburnated surface where the decomposition had previously been active is due, I should judge, to both local and constitutional conditions, and may very properly be termed a vital, as well as a recuperative effort of the tooth, for the pulp has been largely instrumental in its accomplishment. That the tooth, under ordinary circumstances, increases in density, I am well persuaded, and that this is accompanied by an increased resistive power, is also well attested.

The discrimination Dr. Sudduth makes between dental caries and dental decay, I think quite pertinent, and will endeavor to conform to it in my subsequent remarks.

In speaking of the origin of decay, I intended to be explicit in my paper, and give due and full credit to the organisms in their productions. I think I said emphatically, that dental decay is the result of the presence of low forms of life, but before they can take hold of the dental tissue, and act upon it as a digestible ferment, there must be a pabulum for their habitat and multiplication. There must be a decalcification so that the organic matter remaining shall offer the needed elements for home and reproduction; more than this they may do, some varieties of them may by their action consume the sugar in the debris, and secretions, and excrete an acid, and this may contribute to the primary decalcification, but this result may be modified, or even wholly arrested by the influence of systemic conditions upon the oral secretions.

The statement made in the paper regarding the deficiency and subsequently the excess of lime salts being dependent upon the demands of the system, varying with youth and advancing years, is in the form of an inquiry. But the invariable change taking place in the condition of the teeth with youth, from youth to adult life, is a strong argument in favor of the proposition. And, again, the noticeable deterioration of the teeth during periods of gestation and lactation, and their improvement after these periods have terminated, is also an argument in favor of the influence of systemic demands. These changes are observed quite irrespective of the effort of cleanliness.

Dr. Kirk—Is that due to the altered secretions of the mouth or to a change in the structure of the teeth?

Dr. Peirce—To both; the secretions have changed because the supply and demand of nutrition has changed. The blood, at one time impoverished in certain elements, is at another period surcharged with the same elements; and through this same nutritive fluid, it is my conviction, the teeth are also increased in density with adult life and advancing years. The continuity existing between the organic and inorganic is modified, that is, increased or deteriorated.

Dr. Sudduth—In which, the enamel or the dentine?

Dr. Peirce—In the dentine especially is it observed. There is so little organic matter in the enamel that it is not so marked, but I believe it is also proportionately increased in density. Only a few days since an illustration of this varying density and want of

continuity was experienced, in the effort to excavate a cavity in a tooth which had on a previous occasion, been very dense, but on a recent effort it offered little more resistance than would a piece of cartilage.

Dr. Sudduth—Was that in the enamel or the dentine?

Dr. Pierce—It was especially in the dentine, although the enamel offered much less than the usual resistance. I have frequently noticed the difference in the structure and density of the same teeth in different periods of life and in different conditions of health—and this notwithstanding that Drs. Sudduth, Black and others say there is no change. The sharp excavator tells the story.

Dr. James Truman—Microscopists are remarkably apt to be dogmatical. Dr. Sudduth seems to be no exception to this rule. He asserts to-night that the investigations of Rainey demonstrated the existence of calco-globulin in the teeth. He does not give us any confirmation of this statement—beyond mere assertion.

Dr. Sudduth-I have often made the experiment myself.

Dr. Truman—You have not explained how or when. You also assert that the enamel does not increase in density after its first formation. I presume there is not a dentist in this or any other country that does not know from practical observation that it does change.

Dr. Sudduth—You have misunderstood me. I said that if it did become denser it was from the effect of the saliva.

Dr. Truman—Here we have another assertion. If it becomes denser, it must be by imbibition of fluids from the interior. You assert that there is no passage of fluids into the enamel from this direction. I must say dogmatically, that between every enamel rod there is something. What is it? You call it calco-globulin. I say it is organic tissue, and I have the investigations of Bödecker and Heitzman to support this assertion. Aside from this there are certain physiological effects produced, not possible if this were not so. The difficulty of making examinations in this tissue will, probably, prevent anything positive's being said in regard to this. Of one thing we may be certain—that old age brings with it increased density in tooth structure.

Dr. Sudduth—Is it the dentine or the enamel?

Dr. Truman—In both. If the physiological process of nutrition failed, there would be no teeth in the mouth. The density increases as age advances and the enamel, with the other tissues, has its source of nutrition. You say that dentine is formed altogether by the odontoblastic layer at the surface. You acknowledge that

the density of dentine is increased. If the formation is confined to the superficial layer how is this accomplished? How are the lime salts deposited in the dentine? Is it by the action of the fibres? Or is it simply by imbibition? I contend that the only explanation is through the action of the fibres. It is impossible to prove this, and yet we are familiar with conditions that seem to demonstrate it. It is not unusual to find so-called senile dentine with the tubes partially or wholly obliterated; and there is another state, analogous to this, which may occur in middle life, a condition I have never vet seen explained, or even alluded to, except by myself. It is in cases of early loss of teeth, not by pericementitis or pyorrhoa alveolaris, but through a condition of the tubes in which absolute calcification has apparently taken place, in other words, the tubes with their parietes have been wholly obliterated. This prevents nutrition, and the teeth are slowly but surely thrown out of the mouth as foreign bodies. A case of this kind came to me some years ago. The gentleman was about 35 years of age. He possessed a beautiful set of extremely dense teeth. They were gradually loosening and without pathological conditions. I exhausted my skill in efforts to save them, and he eventually lost every one. and that in a comparatively short period. Examination microscopically demonstrated the cause. The tubes were entirely obliterated except for a short distance near the remains of the canal. The dentine in sections presented a clear transparent appearance, as devoid of lines as a piece of glass.

Dr. Sudduth-How do you know they were not always that way?

Dr. Truman—Had they been that way originally, nutrition would have been impossible in the earlier as it evidently was at a later period. Did you ever see a tooth without tubes?

Dr. Sudduth—I have never met with teeth in which the tubes were absent.

Dr. Truman—You will have to take my word for it, as I have not the specimen to show, that these tubes were filled up and obliterated by depositions of lime salts.

I do not believe in "periods of destruction.' I cannot understand that there are times when the individual will lose more teeth by caries than at others. This loss may occur at any age through physiological disturbance resulting in lowered nerve tone and increased acid secretion.

Dr. W. G. A. Bonwill—I wish to give you an illustration of the change in the dentistry of teeth. A gentleman 34 years of age

came to me a while ago; he had good dense teeth, but they were loosening one by one. He was sent to me by two others, whose teeth I had treated, being similar cases. He had been to four of the very best dentists in the city within the previous three months. They told him he would lose them all. He went to Prof. Agnew, who said he must lose them. He went to Garrettson, DaCosta and Pepper, who all said the same thing. I found that all that was needed was a little common sense treatment. He had used a tooth brush most unmercifully, and the tissue was torn away. You could see the bone bright and clean by passing up where neither the brush nor the pick has ever touched, decay had gone on. To effect the cure I simply cleansed the teeth and cut off all super-abundance of tissue. I never saw teeth harder in my life. The gum has nearly grown around the teeth, and there is as perfect a condition as before. The roots of the teeth were as solid as the enamel itself.

Dr. Tees-My attention has been lately called to several instances of the beneficial effect of lime water, upon both the temporary and the permanent teeth of children under my charge. On account of the way in which children are fed in this country, being given all manner of food from earliest infancy, we seldom meet with such cases. The first case was that of a young girl about fourteen years of age. She had a most perfect set of twenty-eight teeth, with no decay in any of them. I asked the mother what she fed her upon in childhood. She replied, that at birth nothing would lie upon her stomach. The physician directed the child to be fed upon cow's milk with a tablespoon of lime-water in each tumblerful. this diet she was brought up until she was five years of age. that she ate bread and butter and eating sparingly of other articles of food, and refusing to eat candies, cakes and other goodies which children generally crave. This young lady is now eighteen years of age, and has one cavity filled. I am sorry to say that she has affected the trashy food of American young people for the past two or three years. I asked the mother how she accounted for the decaved condition of her son's teeth. She replied, "Doctor, his grandmother brought him up."

In another instance a boy five years of age had perfect deciduous teeth, while his sister, three years of age, had teeth in an advanced state of decay. The mother said that the boy had been fed upon limewater and milk until he was four years of age, and she personally saw that it was given him; while the little girl, during babyhood, was in charge of the nurse, the mother's time being devoted to her invalid husband.

The following letter was received from Dr. E. Payson Quick, corresponding member:

SANTA BARBARA, CAL., Dec. 10, 1888.

To the Recording Secretary of the Odontological Society of Penna.

Dear Doctor.—My health being somewhat restored, I opened an office in Santa Barbara, the first of November. I have a case on hand that I would ask the advice of the Society upon.

Patient is a lady, twenty-eight years of age, with good family history. Trouble began about twelve years ago, when a crackling noise was noticed upon opening and closing the mouth; This was followed by a gradual stiffening of the muscles and ligaments of the jaw, so that the mouth could not be opened more than half its normal width. At the same time the lateral movements became very imperfect. At times there is a twitching of the buccal muscles and a peculiar sensation in the tongue. There has been some, so-called, neuralgic pains, but not very severe. All the teeth are in place except the wisdom teeth, and quite a number are filled. The superior central incisors have had chronic abscesses for several years. I have treated them, and the teeth are now in a healthy condition. I have probed carefully for the wisdom teeth, but cannot detect them.

Now, is not this most likely a case of impacted wisdom teeth pressing upon the third division of the fifth pair of nerves, and by this constant irritation for years, bringing on this abnormal condition?

The patient has been in the hands of a number of physicians, but has not received any relief. I have advised the extraction of the second molars, but she fears the operation. So I am trying stretching the muscles and ligaments by placing a cork between the teeth for a few minutes each day, and also having her apply friction with the hands over the parts. By this treatment I have gained over half an inch.

What would the members of the Society advise in this case? Would they advise the extraction of the second molars? An opinion will greatly oblige,

E. PAYSON QUICK, D.D.S.

The following committee was appointed to answer the letter: Drs. James Truman, C. N. Peirce, S. H. Guilford, I. S. Fogg, S. E. Gilbert.

3249 Chestnut Street, Philadelphia, Feb. 10th, 1889.

Dr. E. Payson Quick,

My dear Doctor.

Your communication of Dec. 10th was referred to a committee to consider and reply to. As chairman of that committee permit me to say that in my opinion, the case does not present all the indications of an impacted tooth, certainly not of pressure upon the inferior dental nerve. It possibly may have an indirect influence. Direct pressure, in the horizontal presentation, will produce severe neuroses. I doubt whether extraction of the second molar would avail anything. Loss of power in the muscles of the jaw is by no means unfrequent. In a similar case I used pressure between the teeth without much result. I then applied the galvanic current, with one pole at the neck with a wet sponge, and holding the other in my left hand. I used my right to manipulate the jaw, thus passing the current through my own body, modifying it to that extent. I had the pleasure of restoring the lady to a normal condition in about a week. Similar treatment might be of advantage, and the sooner the separation is accomplished the better.

Dr. C. N. Peirce does not think the conditions described warrant the extraction of the second molars, and before resorting to that treatment, with the present developments, would certainly advise application of the galvanic current.

Dr. S. H. Guilford is inclined to favor the theory of impaction of the third molars, as the cause of the trouble. He would recommend, first, the application of the galvanic current, and if that should fail, then the extraction of the second molars.

Dr. I. S. Fogg inclines to the opinion that an impacted tooth is the cause of the trouble. He would not however, resort to extraction before adopting the treatment recommended by myself, particularly in view of the slight improvement you report in your letter as having been gained by friction, etc.

Dr. Gilbert in an interview coincided with my views of the case.

Truly yours,

JAMES TRUMAN,

Chairman.

JAMES TRUMAN, C. N. PEIRCE, S. H. GUILFORD, I. S. FOGG, S. E. GILBERT,

Committee.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, February 2d, 1889, at the hall, Thirteenth and Arch streets.

President Kirk in the chair.

DISCUSSION OF DR. OTTOLENGUI'S PAPER ON IMPLANTATION.

Dr. James Truman—I am much pleased with the course that Dr. Ottolengui has taken in treating the subject, because I think it is high time that the dangers in performing this operation should be considered. In the cases illustrated, he shows distinctly how necessary it is to be careful. In some of the operations I have witnessed there has been a degree of carelessness exhibited, and I have contended that sooner or later there would be trouble caused by penetrating the antrum. I am only an observer, never having implanted a tooth; therefore I cannot discuss the subject. Dr. Kirk has had a large experience in implantation, and we should be pleased to hear from him.

Dr. E. C. Kirk-I am glad to have an opportunity to say a word upon implantation, particularly after such a good paper as has been given us. There can be no doubt that precaution should be observed from the beginning of an operation. I have observed a course somewhat different from the one described in the paper, because, I have relied exclusively upon bichloride of mercury as a disinfectant for instruments, socket, hands, etc. The case which he presents is very interesting. Some think that the mere penetration of the antrum will produce great inflammation. I do not see why it cannot be entered without so much danger. The case cited to-night is peculiar in itself. In the first place, he had a patient of marked hemorrhagic diathesis. In the second place, he not only opened the antrum, but injured an arteriole. The antrum was full of blood. Following this he closed the opening, and yet he maintains that he kept up antiseptic treatment. The history of the case proves, that no matter how well directed his efforts may have been, he did not succeed in it, because he evidently had a case of septicamia, followed with purulent discharge. He could not thoroughly inject into the antrum and wash it out, because he was afraid of increasing the pain and causing a return of the hemorrhage.

I have been anxious to find just such a case, because we who believe in the operation are constantly having practitioners predict trouble. Dr. Ottolengui has shown one case where we may have

difficulty—in a patient of hemorrhagic diathesis. After rupturing the arteriole and filling up the antrum with blood, to put in the tooth, and thus allow putrefaction to take place, was not good practice. In using a spear-pointed drill, I carry it with extreme caution to the depth I want the root. In drilling slowly, suppose you do make a perforation, any dentist can tell in opening any cavity when he runs into the pulp chamber. The cut of a spear-pointed drill in this manner cannot be productive of harm unless in such a case as Dr. Ottolengui cites, which is followed by excessive hemorrhage. In a majority of the cases I ligate the tooth in position; I do not use silk or linen ligatures, but prefer the one suggested by Dr. Farrar in retaining teeth-soft annealed brass wire, No. 31. I have used it repeatedly for that purpose, and when implanting, use it for holding the tooth in position. It does not corrode, and is without any irritating effect upon the gum and soft tissues. It has given entire satisfaction, and I have used it almost exclusively. In some cases, when I first practiced implantation, I used silk ligatures; but they were not as satisfactory in any way as the brass wire. During the time of repair and healing, antiseptic measures are kept up by using phenol-sodique as a mouth wash.

Dr. Ottolengui—Dr. Kirk comments upon the insertion of the tooth under the existing circumstances. I was advised to take the tooth out, although when I put it in the hemorrhage stopped. The packing had to be put in with considerable solidity, because the blood would not clot without doing so, and when it finally stopped flowing externally, it still oozed into the antrum.

Dr. Kirk may be right when he asserts that there is no trouble to be apprehended in opening into the antrum, but he must remember it is not an ordinary cavity. It is one in which the opening is at the top; fluids cannot escape until it is two-thirds full, when they flow into the nares; it is important to avoid puncturing it, because in the passage you may rupture some vessel that will pour its contents into it. There is a difference in opening into the antrum in disease and drilling into it in implantation. In disease, there is a diseased root that is first removed, a long socket exists and only a little bone is removed. In drilling a socket into the new bone it is different. This not only has arterioles in it, but it is filled with blood, and to rupture a vessel gives rise to a possibility of the blood pouring up into the cavity.

My instruments are a combination of the drill and the reamer. They have nine leaves to them, and only three go to the top. It is very much simpler to use a construction that will not only drill the depth you want, but also do lateral reaming. It makes a difference whether the operation is performed in one hour or in a few minutes.

Dr. James Truman—I am sorry it was necessary for Dr. Kirk to leave. He did not seem to think the hemorrhage was a matter of any great importance, that it could have been readily controlled, and that the placing of the tooth was a wrong measure. This may have been true, but what was he to do about a hemorrhage of that character? It was necessary to have some pressure upon that arteriole to stop the hemorrhage and produce coagulation. In that case he would necessarily force blood into the antrum, which would become decomposed. I do not see how it could be possible to keep the cavity open. I do not think we can penetrate the antrum with impunity. If we do so there will be irritation, and inflammation will be set up in the lining membrane and the development of micro-organisms. If there is no harm in opening into the antrum, and no possibility of evil, then I have not learned my lesson well.

Dr. Ottolengui—One thing seems to have escaped Dr. Kirk—that the blood came from the lining membrane itself. It would be difficult to get a compress up there to stop the bleeding, even if the character of the blood was such as would readily coagulate.

Dr. James Truman—I wish to express my gratification, not only for the paper, but for the kindness of Dr. Ottolengui in presenting the Society with these illustrations, which show very clearly the danger of this operation, with the possibility of trouble, and other facts in connection with it, and I wish to offer a resolution that the thanks of this Society be offered the Doctor, not only for the paper, but for the kindly presentation of the pamphlets.

Subject passed.

Dr. Head then presented some new points in relation to root filling.

Dr. Jos. Head—In my paper of last month I asked some questions at the end which were not, to my mind, satisfactorily answered. They were as follows:

Does not gutta-percha leak when used for filling canals?

Do not oxy-chloride of zinc and phosphate of zinc leak when used for filling canals?

If they leak, do they not place the tooth in danger of alveolar abscess?

Do not these leaky substances make a harbor for germs of of putrefaction?

And, lastly, cannot a thoroughly water-tight antiseptic stopping be made with cotton soaked in a 30 per cent solution of carbolized cosmoline?

It was said by Dr. Truman that gutta-percha, when used as a canal dressing, in his opinion, did not leak. My experiment with glass tube tests, which I admit are very crude tests, was criticized on the ground that the glass expanded. It was not denied that oxy-chloride of zinc would absorb moisture. One gentleman, a visitor, advised me to take a glass tube drawn down at the end to the size of the apical foramen of a tooth. This, when filled with gutta-percha, he said, would exclude moisture for months. I did not carry out his experiment, as the unequal expansion of the glass and gutta-percha again could have been brought forward. I concluded to set aside all unnecessary complication by taking natural teeth-three, and opened into the canals and filled them much more thoroughly than it could be possible to do when situated in the mouth. After cleansing the canals by careful drilling into one of the teeth, warm gutta-percha was inserted until it streamed from the apical foramen. The other two teeth were respectively filled with oxy-chloride of zinc and cotton soaked in carbolized cosmoline. The holes in the crowns of these teeth were then filled with gold. Having operated on these teeth January 7th, I dipped them in a solution of analine ink. They were removed on the 1st of February, having been submerged just twenty-four days. I then laid bare the canals, and here they are, gentlemen, for your inspection. I think you will all perceive that the gutta-percha has not only leaked, but even its surface, to a slight degree, has absorbed the ink. The oxy-chloride of zinc is permeated with ink, while the canal guarded by cotton and carbolized cosmoline is absolutely intact.

The cosmoline has also permeated the structure of the dentine, making it water-tight and antiseptic. But the chief merit of this filling lies in the fact that it can be readily removed. It has been said by my friends that I do not fill teeth with cotton, but fill them with cosmoline. And yet, in the same breath, they assert that I sometimes fill teeth with cotton and carbolic acid, objecting to this practice on the ground, that the carbolic acid evaporating, leaves the cotton ungarded.

Why do not they say that I fill teeth with carbolic acid only? It would be just as logical. They must know that the cotton acts as a vehicle for holding an antiseptic. No one, at the present day, thinks of using it unguarded. Cotton, when saturated in cosmoline,

renders venting of the canal much more easy of accomplishment than when cosmoline alone is used.

The great advantage cosmoline has over all other medicaments, lies in the fact that it readily permeates the entire structure of the tooth, thus rendering the tooth water tight.

Dr. James Truman—Cosmoline as a filling material may be indestructible; if you can work it into a canal. I have not the slightest question but that it would make a good filling; and if a few fibres of cotton go in, it will be good. My controversy was in the use of cotton and carbolic acid. I said that carbolic acid would eventually lose its power in the root canal, and that it would leave a very good field for micro-organisms. Dr. Head has taken the precaution to use cosmoline. I have no controversy with that. I do not know from any experiment that it will preserve teeth. I take his word for it, and I believe it is possible to be used; but I would like to have sections made of these teeth which he presents, and examine them under the microscope. To be sure, it looks as if the teeth have leaked; but I would prefer, as a positive test, before deciding the question, that they be made up into sections, and then be carefully shown under the microscope.

Dr. Head-Dr. Truman has nothing to say against cosmoline. Then let us lay that aside. He says that he has something to say against cotton soaked in carbolized cosmoline. The specimens which I have just shown to you show that oxy-chloride of zinc and gutta-percha absorb moisture. What more can cotton do? He finds fault with cotton, and yet approves of oxy-chloride and gutta-percha. I should like Dr. Truman to tell me in what way oxy-chloride of zinc and gutta-percha are superior to cotton. Cotton is not only easily removed, but is also capable of holding an antiseptic. Oxy-chloride of zinc and gutta-percha do not hold medicaments. But, perhaps, some one of you will say that oxychloride of zinc is in itself an antiseptic. I think anyone who has smelt any oxy-chloride filling that has been in the mouth for six months will hold an entirely different opinion. Such a filling, when examined, will be found to contain gas sufficient to make half a dozen alveolar abscesses.

Dr. Chupein—I have used carbolic acid or creosote and cotton for thirty odd years, and I have never been able to see that the practice has been detrimental to the salvation of the teeth, the canals of which have been filled in that way. Dr. W. H. Trueman filled canals for a great many years in that way. At a meeting of the Pennsylvania Association of Dental Surgeons, he said he had

been using gutta-percha. I asked him if he had gone back on cotton, he said "No, but I have been experimenting in deference to the opinion of others." I have used cosmoline with cotton, but have not had experience enough to say whether it is more favorable.

Dr. D. N. McQuillen—For five years I used cotton a great deal in canal filling, and had a number of abscesses. During the past five years, have not used cotton as a permanent filling, and have had a different experience.

Dr. Head.—In my paper, I said that it is not sufficient to fill the tip of the canal with cotton, the root should be filled with cotton up to the pulp chamber.

The great objection to gutta-percha lies in the fact that when a tooth is filled with this material, should inflammation arise, the patient is almost to a certainty compelled to undergo the pains of alveolar abscess.

With cotton this difficulty does not arise, as its fibres can be readily removed. When, of course, the tooth being vented, the gas escapes and the patient is relieved.

Dr. Ottolengui—We, in Brooklyn, have been converted by Dr. Van Wert to his method of filling root-canals. He uses:—

R.	Iodol	5j
	Oxide of zinc	5ij
	Cosmoline	Y. S.

Make into a stiff paste; it requires dexterity to make it so.

We fill canals with it, and we do not have any abscesses.

Dr. Head.—While that makes a good filling, it does not, in my opinion, make a better filling that pure carbolized cosmoline. I did not say that the principal use of cotton was to act as a vehicle. The chief advantage is that the filling can be easily removed, thus saving the patient from alveolar abscess.

INCIDENTS OF PRACTICE.

Dr. B. F. Place—I extracted a number of upper and lower teeth for a lady, about thirty years of age. The lower teeth were badly decayed and diseased. The lady went away without any trouble; the gums healed up nicely; but two months afterwards, she complained of a great deal of pain in the upper and lower jaws. Whenever she exposes herself to a draft of air or goes out, she has great pain along the zygoma, and often there is some slight inflammation, more on the left than on the right side. I was inclined to believe that there might be a small piece of root remaining; but I

was careful in removing them, and know there was no sign of foreign bodies there, except a small piece of the process, which had been imbedded in the gum, and which I removed. She complained of pain, which at times, is better than at others. The soreness is more on the left side than on the right. She has not had any teeth in. I thought possibly that it might be some trouble with the nerves, and I would ask the opinion of the gentlemen here.

Dr. S. E. Gilbert—I have the models of a couple of cases of irregularity which I have corrected. The first is that of a young lady of twenty years of age, where the left superior lateral is thrown inside of the arch and overlapped by the central incisor; the inferior teeth closing over its labial aspect. To correct this, I used a "cross-bar," as described and illustrated by Dr. Shaw, in April Cosmos, 1888, page 215. The correction was accomplished in eleven days, causing very little soreness. The retaining fixture consists of a very thin platinum band (made to fit the tooth), with a cross-bar soldered to it, so that it rested against the labial surfaces of the adjoining teeth. This fixture was cemented to the tooth and allowed to remain.

The second case is that of a Miss of fifteen, and as you will see by the cast, the superior incisors are very prominent, so much so, that the lips could not be closed. This was corrected by means of a vulcanite plate, made to fit close to the molars and covering the palatal surface of the mouth. A rubber ring cut from small french tubing was fastened to the centre of the posterior part of the plate, and a silk ligature passed through the ring, the plate placed in the mouth and the ligature drawn forward, passing it between the centrals and tied over a cross-bar of wood. The tension brought to bear by the stretching of the rubber ring soon moved the teeth backward and into place, as shown in cast No.2, which was taken after the case was completed. The improvement in the features is very marked.

Subject passed.

Editorial.

THE APPROACHING DENTAL CONGRESS IN PARIS.

In the "Foreign Correspondence" department in this issue, appears a long letter from our late lamented confrere and correspondent, Dr. E. Brasseur, relating to the International Dental Congress, to be held in Paris in September, and to which all American dentists, who desire the advancement of their chosen profession, are cordially invited.

We have refrained from saying anything in regard to the Congress, preferring to allow our foreign correspondents the privilege of setting forth in our columns the merits of their claims to American support, and this, we are happy to say, they have ably done. We are heartily in favor of supporting the coming Dental Congress, and feel safe in assuring our readers of abundant hospitality and a profitable time, should they desire to attend its sessions this fall.

We offer our support to the Congress on the basis of its object, as explained by its foremost promoters, Drs. Brasseur, Dubois, and Kuhn, who disclaim any intention on their part to supplant in any way the dental section in the Tenth International Medical Congress to be held in Berlin. This is unequivocally stated in their letters published in this journal. We feel called upon to make this statement, because of an editorial which appeared in the Dental Review, of Chicago, for May, in which it is said that "an attempt will be made to secure the Second International Dental Congress for the Auditorium Building, Chicago, September 1st, 1892." If this be done it will cripple, if not entirely destroy, American interest in the dental section of the next medical congress in Berlin. Should the Review persists in its efforts to call a return congress here in 1892, it will work an irreparable injury to the present congress. The notion of continuing the French congress, as a separate Dental Congress, is entirely foreign to the intentions of its promoters. They consider it simply at a part of a number of bodies that have been convoked at Paris, because of the excellent opportunity afforded for doing so by reason of the large number of professional men that will, in all probability, attend the exposition this year.

Dr. Brasseur states very plainly how it came to be called International. There is no mistaking the tenor of his letter. He most disqualifiedly denied any intention on his part, or that of his confrerés,

in any way to interfere with or supplant the dental section of the next International Medical Congress. Neither is Dr. Dubois any less frank in his denial; for he says: "In assembling this congress the French dentists do not wish to interfere in any way with the dental section of the International Medical Congress to be held in Berlin." Dr. Kuhn also says in his letter, published in the April number of the Journal: "I can boldly affirm that this idea (of interfering with the Berlin congress) has never entered the mind of any one among us in France." These statements are so frank and open, that no one can doubt the candor of those who make them. And if the matter is allowed to drop here a full contingent of American dentists will be in attendance at the congress; but we predict, that if the Review continues to push its pet plan of calling a return congress, there will spring up a strong feeling of opposition, which will show itself during the remainder of the summer and fall. American dentists have struggled too long to obtain medical recognition, to submit now to be thwarted, in order to please the ideas of a very small faction in America.

We pledge our hearty support to the French Congress, as explained by its promoters, Drs. Dubois, Kuhn and Brasseur. This we have done in the past, in allowing the free use of our columns for a full presentation of the subject, and will still continue so to do. On the other hand, we shall strenuously oppose the calling of an independent dental congress in America, and shall use our utmost endeavors to prevent it. The calling of a congress, however, is one thing, while making of it a success, is quite another. We think that the Review has perhaps been slightly precipitate in designating the new Aditorium Building as the meeting place for the return congress, as we are credibly informed that its seating capacis only 5,000, which may not be great enough to accommodate all who may desire to attend. In the mean time, active preparations are going on for the coming congress, and all who wish to present communications should send them as soon as possible to the Secretarv. M. POURCHET,

24 Rue de la Chaussèe, d'Antin, Paris, France.

YOUR CORRECT NAME.

If those members of the profession, who speak at the different dental conventions, will send us a postal card bearing their full name and titles we shall be much obliged, as we desire to make up a list for reference. In order to have your name appear in print as you want it, please attend to this at your earliest convenience.

THOSE SUBSCRIPTION BILLS.

On the first of April we sent out bills to all persons who were in arrears for their journal. We have had returns from a large number, but not all. If any have forgotten to attend to the matter on account of the rush of work coming at this season of the year, let this be a gentle reminder, and attend to it before going away for the summer. We also desire to say to those, who had paid their subscription through some agent or depot, and who still received bills, that it was a mistake arising through crediting the house, and not the subscriber also, and which has been rectified. We are sorry to have bothered them, and will see that it does not occur again. Mistakes do sometimes occur in the best of regulated families, you know.

IMPORTANT DISPATCH FROM DR. CROUSE.

DEAR DOCTOR:—Did you receive the circular and By-laws recently mailed to every dentist in the United States? If not, or if you have mislaid them, will gladly send you others.

Have you read the circular? If not, why not? If you have read it, have you signed and sent By-laws, with membership fee (\$10.00), as requested? If not, will you not do so at once? Also, send us history of any cases you have or know of, as described in circular.

We have already received description of many new cases, which will add valuable testimony in our favor in the coming contests.

Many have already joined the Association, but we want many more.

The amount of money required of each one is very small. The fee, however, will remain at \$10.00 till a certain number is obtained; after that it will be but just, and in accord with similar organizations that those who join shall pay a larger membership fee.

We feel sure, speaking from the advice of our attorneys, Messrs. Offield and Toule, that we shall eventually be successful against all the claims of the Tooth Crown Co.

Many are asking if it will not cost more, to settle with that Company, if we should fail.

We answer, No, as the rates of licenses and royalty have already been established, and such rates will be held as legal in cases of past infringements and future licenses.

But we cannot fail if dentists pull together.

Will you help, or hinder by holding back?

Let us hear from you.

J. N. CROUSE,

Chairman, 2231 Prairie avenve, Chicoga.

Foreign Correspondence.

The following letter from the late lamented Dr. Brasseur has been handed us for publication. We were in possession of a promise from the Doctor of a communication on the subject-matter included in this letter, and which, except for his untimely demise, he would surely have furnished.—[Ed.]

To Dr. J. B. DAVENPORT, 73 Bd Haussenaun, Paris.

MY DEAR COLLEAGUE:

You have had the kindness to read us, at a private meeting, a letter addressed to you by Dr. Thackston, in which he manifests to you his fear of seeing the French dentists take, for the Dental Congress that is to be held this year, the denomination of *International* Dental Congress.

Knowing and appreciating the high professional position of Dr. Thackston, I most earnestly desire to dissipate any doubts that may arise as to the object of our congress and I hasten to reply to his objections, even begging you, if necessary, to communicate to him my explanations.

Our colleague fears that if the French dentists give to the approaching congress the title of *International* Congress, and above all if this congress obtains all the success that it is destined to have, it will draw upon the entire profession the general dissatisfaction of the medicine body, and that consequently the dental section will be effaced from the programmes of future international medical congresses.

One fact has certainly contributed to this error of interpretation. Remember what happened in America when the International Medical Congress of Washington was formed. Dr. Kingsley made at that time the most strenuous efforts to separate the dental art from medicine and surgery, claiming that our art was special, having no connection with the medical art, and that dentists had no interest to take part in the International Congress. Is it not this recollection that to-day leads Dr. Thackston to communicate to you his fears, that we would be the first to entertain, if we had for one moment the idea of adopting Dr. Kingsleys views?

The proof of the contrary is clearly demonstrated by all our acts ever since we have been united and formed into a society, that is to say since 1879; to which society both you and your esteemed colleague Dr. Bogue belong, and of which, consequently, you can better than any others make known its strong medical attachment.

Did we not take an active part in the International Medical Congress of London, where for the first time our art formed a special section? Is not this also true of the congress at Washington, and are we not ready to participate in the one of Berlin in 1890? If we have taken the title of International Dental Congress it is because the congress has been formed with the support of the government and precisely on account of the great number of strangers of each profession that will be certain to visit the International Exhibition; this title has been imposed upon us as upon the sixty odd congresses of various societies that will meet at that epoch. We take advantage of this affluence of strangers in our Capital to convoke all dentists, whatever may be their nationality, and we consider this congress as absolutely independent of the International Medical Congress that is to meet at Berlin in 1890.

There will be in Paris during the exhibition, as I have said to you, a great number of congresses that will all be international, for instance, the Hygienic Congress, the Anthropological Congress, the Professional Medical Congress, etc., etc. We dentists, though having a special dental congress, can take part in these other congresses, because we may there find questions interesting us. Take for example the Professional Medical Congress (where will figure doctors, druggists, dentists and veterinary surgeons). These reasons which I have very sincerely given, are those that have caused us to accept the title of *International Congress* and which we are absolutely obliged to accept without modification.

I take this opportunity, my dear colleagues, to beg of you to make an earnest appeal in our name to the good will of our sympathetic American colleagues, asking them to come and take a large part in the congress. [Je profite de cette circonstance, mon cher confrére, pour vous prier de faire en notre nom un pressent appel a la bonne volonte de nos sympathiques confreres Américains pour qu'ils viennent prendre une large part a notre Congrés]. We know that in every place where there is question of science and profesional interest one is sure to find Americans with their practical ideas.

Receive, my dear colleague, the assurance of my best sentiments.

E. Brasseur,

President of the Société Odontologique, Director of l'Ecole Dentaire de France.

Paris January, 15th 1889.

Domestic Correspondence.

TO THE EDITOR:

As the planting of teeth, is now becoming so common an operation, and probably destined to become more so, the importance of furnishing some means whereby a planted tooth may be firmly held and supported while it is becoming firm in its new position cannot be over-estimated. Lack of proper support is probably the cause of a large percentage of failures.

Fig. 1 illustrates a very simple and efficient splint for this pur-

pose. It is easily and quickly applied, and may be worn any length of time without inconvenience to the patient. On each side of the space in which the tooth is to be planted is selected a suitable tooth. A strip of band material (shown at F, Fig. 3, page



Fig. 1.

324) is made into the form of a loop, slipped over the tooth and drawn tightly about the same with a pair of flat-nosed pliers. It is then removed and soldered at the point of union, and the ends clipped off. Delicate pipes (as shown at R, Fig. 3, page 324) are now soldered to each of these bands, on the labial side and parallel to, the axis of the tooth. After carefully drying the teeth, the bands are cemented in position. This may be done severa hours or even days in advance of the operation of planting.

The tooth to be planted is banded and piped in the same manner already described, only the pipe is soldered to the band at right angles to the tooth. A piece of the gold wire of suitable length is cut (shown at G, Fig. 2, page 324), which exactly fits these pipes. It is slipped through the pipe on the tooth to be planted, and each end is bent at right angles. The tooth is slipped into the socket already prepared, the ends of the wire are slipped through the pipes on the anchor teeth, and, as they pass through, are snipped off with a pair of wire cutters. This will also flatten the ends slightly, which will prevent the splint from coming out of the pipes.

I have frequently dispensed with the band and pipes which encircle the planted tooth, using instead a silk ligature, tying the same tightly around both tooth and splint. This simplifies the operation, and in most instances is quite sufficient.

Dr. John H. Martindale, of this city, has used this form of splint with success in a number of cases for the support of teeth which have been loosened by alveolar necrosis or pyorrhoa.

The advantages of this little device in ease of application, comfort to the patient, and, above all, cleanliness, offering so little refuge for bacteria, will, I think, be readily appreciated by all.

Minneapolis, May 25, 1889.

EDWARD H. ANGLE.

To the Editor:—Enclosed I forward to you an exact copy of Dr. John Greenwood's advertisement, which I found in the New York City Directory for 1786, taken from the newspaper abstracts of that period (1785), entitled, "Annals of New York City." The originals were published February 28, and November 20, 1786, respectively. The Greenwood referred to below was General Washington's dentist.

A paragraph on page 200, reads thus, "J. Greenwood, dentist, real maker of artificial teeth, makes and sets in teeth so exact as not to be distinguished from the natural, they are not to be taken out at night as some falsely suppose. He likewise transplants natural teeth and fixes them upon gold. He will wait upon ladies and gentlemen at their houses, and may be spoke with at No. 21, John St."

On page 110 is another as follows:

"John Greenwood, dentist, No. 199 Water Street, substitutes artificial teeth in so neat a manner, as not to be perceived from the natural; they give a youthful air to the countenance."

I send these for the JOURNAL if you think it worth while. Note the style of language, which I reproduce exact.

New York City,

May 14, 1889.

J. N. FARRAR.

To the Editor.—Although vigorously opposing every form of implantation of natural teeth, the criticism in the May number of The International Dental Journal, by Dr. E. A. Bogue, of an implantation operation performed by Dr. R. Ottolengui, and described by him in the January number of the Dental Cosmos, compels me to come to the defense of this method of uniting teeth together.

I have advised this manner of preserving the usefulness of teeth suffering in the last stages of Pyorrhea Alveolaris before several assemblages, and with the knowledge personally given that many dentists have adopted this operation, it seems fit that I should champion it when attacked in the insidious manner. It is quite evident that Dr. Bogue, who is so keen and intelligent an observer and also an excellent operator, has never seen one of these operations, or he never would have made the contradictory statements soamusing to one who has seen the operation.

The lamented Marshall H. Webb, was often heard to remark that he "preferred one of his gold fillings to the best tooth strucutre ever created."

Dr. Bogue in his criticism supplements this by the following: "If all crevices and crannies existing in a tooth can be filled with

any indestructible substance, and the surface made flush with the smooth surface of the tooth, so that it can be kept clean from deposits on every side, that tooth is practically free from decay s long as it is kept clean." Now this is exactly what has been done in Dr. Ottolengui's operation, and is the only way such operations should ever be performed; that is to leave them, as any good operator would leave his best specimen of a gold filling. The operation was devised to hold teeth, however loose, in a firm position and to prevent the assemblage of bacteria, while every other form of holding loose teeth in a firm position, materially assisted in gathering around these teeth immense numbers of the various forms of bacterial life.

This is why Dr. Bogue's criticism seems amusing. To quote further from Dr. Bogue; "before a wall of perfect enamel, germs are inoperative and powerless. Nature's form and arrangement of perfect teeth, is such that this wall must be breached before these microscopic enemies can get any foothold." In performing this operation the groove is always made through the cutting edges of the teeth a position where this wall of perfect enamel is breached early in life; in fact in cases like the one reported in the January Cosmos (involving the inferior incisors), the enamel soon disappears entirely from the cutting edges, as it had disappeared in the case of Dr. Andrews. According to Dr. Bogue's own statement which I have already quoted, he admits that such surfaces as these present a most inviting field for the legions of bacterial scavengers to promote caries, in the exposed dentinal structures.

I cannot see how the filling of such crevices and crannies with gold which has been made flush and smooth with the unbroken wall of enamel on every side, can be made a special nest for the bleeding of multifarious bacteria.

Meyer L. Rhein.

No 104 E. 58th Street, New York.

Current News.

The Boston meeting was a decided success.

Are you going to Newport to attend the meeting of the American Medical the last week in June?

The Dental section of the American Medical Association promises to be of greater interest this year than formerly.

All Dentists who desire to see dentistry recognized as a medical specialty should attend the regular annual meeting of the American Medical Association to be held at Newport, R. I., June 25th, 1889.

NEW JERSEY STATE SOCIETY.

The ninetcenth annual session of the New Jersey State Dental Society will be held at the West End Hotel, Asbury Park, N. J., commencing Wednesday, July 17th, and continuing the 18th and 19th. Prominent dentists from throughout the country will read interesting papers, and the clinics will be more than usually instructive. Everything new and useful in operative or mechanical dentistry will be exhibited, preparations having been made for plenty of space. Low hotel rates will prevail.

CHARLES A. MEEKER, D. D. S., Secretary.

IMPLANTATION DATA DESIRED.—In order to obtain and place on record a consensus of professional experience and judgment in regard to Dental Implantation, it is desired that dentists in this and foreign countries will kindly submit to the Chairman of Section VI, of the American Dental Association, facts called for under the following inqu ries:

- 1. Date of each operation, sex, age, temperment and physical condition of the patient.
- 2. Description of the implanted tooth; date of its extraction; condition of the peridental membrane; preparation of the root by trimming or shortening; filling material used in the root canal.
- 3. Antiseptics used in preserving the tooth for implantation, and during the operation; also the antiseptic washes prescribed after the operation.
- 4. Instruments employed in the preparation of the artificial socket, and the method of sterilizing the same.
- 5. Appliance used for retaining in place the implanted tooth, and the length of time employed.
- 6. Subsequent history of each case to date of report, or up to the time when last seen or heard from.
- 7. In cases which have failed, specify minutely the causes of failure, together with an exact description of the appearance of the implanted tooth after extraction.
- 8. Total number of teeth implanted; number deemed successful, and the number known to have failed.

It is earnestly requested that facts of the kind above indicated shall be sent before the first of July next, to Dr. H. A. Smith, No. 128 Garfield Place, Cincinnati, Ohio.

H. A. SMITH.

Cincinnati, Ohio, May 20, 1889.

THE

International Dental Journal.

VOL. X.

JULY, 1889.

No. 7.

Original Communications.1

ELEMENTS OF SUCCESS IN DENTAL PRACTICE.2

BY S. B. PALMER, M.D.S., SYRACUSE, NEW YORK.

At we look out upon nature and see the globe with its mountains and valleys, its oceans and rivers and all the forms of life therein contained, together with the atmosphere that surrounds it, we can hardly comprehend that in nature's laboratory are found less than seventy simple elements from which all natural substances are made.

This illustration applies well to the practice of dentistry. A few positive elements harmoniously combined will insure success, as a few negative elements mechanically compounded will beget failures.

Elements combine according to the law of affinity in systematic order, and in definite proportions: thus in office practice we may see the end from the beginning, or anticipate results without experiments. We cannot change the relations between cause and effect, but we may so arrange causes that the right effects will follow. This is science: without this knowledge we must do as we are told, and good results are simply good luck.

Success in dental practice is made up of elements arranged by the

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¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read at the semi-annual meeting of the Massachusetts Dental Society, Boston, June 5, 1889.

practitioner. Patients are retained or repelled according to the affinity between the operator and his patient.

Dentistry is a poor profession to choose without natural adaptation. If the inborn mechanical element is lacking, both dentist and patient will suffer in consequence. That dentist belittles himself who in after-years quotes his college instructions as authority for practice. The progressive dentist very soon outgrows his schoolday teachings, and goes on thinking, acting, and inventing for himself.

Dentists may be divided into three classes; individuals are not necessarily confined to either from public sentiment; the boundaries are not arbitrary, but each finds his level according to the law of professional gravity.

It is often remarked that there is plenty of room at the top; so is there plenty of low standing-room at the bottom, which is well filled up with a professional mass rather than a compound. There may be found the coarser elements of the profession, such as have no affinity for higher grades, and who are seldom seen to rise above their level. This class receives support from a corresponding grade of patients who do not appreciate good work.

The second grade is mainly composed of those whose ambition is satisfied with a large practice and small profits. The management seems more mechanical than professional, although many destined for the highest standing are compelled to enter and pass through this training grade. For instance, the young graduate, without means to establish a lucrative practice, perhaps, too, in debt for his tuition, finds this the only starting-point, but with a proper combination of elements he will soon rise above and enter professional service. Here, too, may be found the established practitioner who does not dare to close his office in order to attend conventions, for fear that his competitor will secure the ten-dollar case he might lose by his absence. Others fail from lack of enthusiasm. Emerson says, "Without enthusiasm no great thing is accomplished." Thus they are held back by indifference.

The third degree is progressive in its nature, and is the only true representative caste of the profession. It advances practice, holds conventions, maintains literature, and establishes colleges. A combination of certain elements will lead to progress. Purity, frankness, and integrity lie at the base of moral character. Sacred as these virtues are, common sense is necessary in their application. It is desirable and important that every dentist gain the confidence of his patients. The young man will, of course, meet with cases

beyond his skill to diagnose; frankness might prompt him to say, "I don't know." This, however true, would be an element of weakness; good judgment would meet the case by doing something promptly, and thus gain time to learn what to do.

On the other hand, the violation of the principles of integrity is sure to work against success. In the treatment of children no one can afford to inflict pain through deception. The breaking of a root in extracting may remain concealed from the patient's knowledge for months, but, when the fact is revealed, the sufferer is not usually in a forgiving mood, and confidence is at once destroyed.

Operations are often called for quite too difficult to be undertaken by the inexperienced. Never say the thing cannot be done; it is only a challenge for another to try, and, if the trial proves a success, the one is elevated, the other depressed in the estimation of the patient.

The fact that dentistry is being divided into specialties affords an inexperienced operator the opportunity to refer any operation he feels himself incapable of doing to a specialist. By so doing, the one referred to is flattered into friendship, while, on the other hand, the case might be turned to disadvantage.

Dignity is an important factor in character: rightly used, like iridium, it stiffens the compound, but too much renders it fragile. Reputation should be established upon real merit: to build upon the imperfections and failures of others is to place enemies at the foundation of your own success. Much harm comes of unnecessarily speaking ill even of disreputable dentists; they exert influence for good or evil.

In relation to education, it is well to invoice knowledge and know where we stand. Tabulate all new departures and the results of experiments. Knowledge is obtained from many sources; without some systematic method of retaining what is learned, one forgets a portion, and thus progress is slow. Practically, the reading of two or three journals will keep a student well informed. This benefit is due to patients.

Of course, at the present time no one should engage in dental practice without a college diploma. This, at once, is evidence of a certain amount of study; it introduces the holder to the public as well as to the profession. During college training, the mind is disciplined, manners are polished, instruction received in conducting the affairs of the office and conduct towards patients that private study never affords.

This is an essential element, but the dentist who relies wholly

upon his college attainments and experience in his own practice is like a plant growing in a pot; the best possibilities are circumscribed. What lectures are to the student during his college course, discussions and clinics are to the dentist in practice. Reading is well, but the same communication imparted by enthusiastic speakers and the discussions which follow make impressions far more lasting. Seeing is believing; the instruction imparted in clinics cannot be successfully reported. Some think they cannot afford these opportunities. Gentlemen, it is stock in trade; we get nothing good without exertion; perpetual motion is still a dream of the future, because all motion requires energy. The formation of a crystal, the opening of a flower, the highest attainments of human intellect, are the results of forces spent and lives extinct. The dentist who does not draw from this source of knowledge will have none to spare for the benefit of his practice.

Dentists in every State or Province should be united in one brotherhood; condemnation and ill-treatment of others generally comes from ignorance,—not wholly from the want of knowledge respecting the usage of good society, but ignorance of the good qualities of the accused, which are best learned by friendly association. Again, it is unsafe to operate outside of professional protection. In this particular, union is strength.

In every community there are to be found would-be victims of malpractice. Equally shameful is the fact that the legal profession furnishes coworkers, ready to share in any black-mail speculation that can be made to pay.

All cannot possess an extensive library, but by care much may be done by way of a substitute. Some writer has remarked that if he could have but three books, they would be the Bible, Scientific American, and Index Rerum. I would make it four, and add an Unabridged Dictionary. A library index in the hands of the student would represent a library relating to the subjects most prominent in the mind of the compiler, as the book is an index of all knowledge entered therein or tells where the item or passage may be found, perhaps in an accompanying scrap-book or in books belonging to other libraries; all is there filed for ready reference.

We now leave the question of education and take up the subject of practical office work, from a scientific stand-point,—not that I have any new mode of operating to offer; practice and observation will instruct any one. Progress by this method is slow and empirical. Advancement in dentistry to the present is mainly the outcome of this method of teaching. Science that only demonstrated the standard of the science of the sci

strates facts previously obtained is of no great benefit, as facts would stand without science. This movement reminds one of the crawfish, which travels backward as well as forward. The real benefit of science is to look ahead and be able to connect cause and effect. The result of operation in filling teeth is based upon positive natural laws or principles. Every filling when inserted becomes a cause; the effect may be concealed in the long future.

We desire to effect preservation by filling, and often fail. When we become conversant with the relations of the filling materials to the teeth filled, we may with certainty anticipate results, and thus introduce those conditions which will favor success. As an illustration, most operators have observed that gold fillings fail when inserted in children's teeth, especially in proximate cavities in the incisors. Practice has taught this, as well as that gutta-percha preserves this class of teeth until they are in a normal condition. One of the greatest mistakes of young operators is to fill this class of teeth with gold, thinking other failures were due to imperfect manipulation, when in fact there is a principle against success under these conditions, and repeated attempts are useless. The reasons will be given further on.

This doctrine was given to the profession some seventeen years ago, and for a number of years was discussed and not infrequently ridiculed, because it preferred charges against gold, which at that time was king, and to speak of facts was treason. Now gold and tin, gold and amalgam, and even copper amalgam, receive free discussion by leading dentists throughout the country.

Claiming nothing for contributions upon this subject, I will say that practice is greatly modified; the doctrine is incorporated in text-books and taught in college. The whole subject may be found in the second volume of the "American System of Dentistry."

A thorough knowledge of the adaptation of filling materials to the various conditions and kinds of teeth is an important element to success; we will therefore consider some of the conditions met with, and the means used in their treatment. Eighty per cent. of teeth that require filling may be disposed of in a few sentences, as all are familiar with the material used, as, all things considered, gold is best in these cases. We have no need to cite its success for forty or fifty years as proof that gold preserves teeth. On the other extreme, we can as truly say it will fail in two years; both are true. What we most need in dental education is clear and distinct ideas of principles. There are as many causes as there are definite results. For the sake of clearness, we will say that

normal tooth-structure is composed of seventy-two parts lime or inorganic matter, which is almost a non-conductor of thermal or galvanic disturbances. Empiricism has long since established the fact that gold will preserve teeth of average density as long as needed. Let the argument be based upon this foundation, that all teeth may be filled with gold if the structure is sufficiently dense to exclude fluid circulation between the filling and the dentine, which is a well-established fact.

How are we to know this condition and what happens if there is a too large percentage of organic matter? The excavator reveals the character of the dentine as effectually as a probe does the nature of a wound. Dentine that resembles cartilage in structure, to a degree that cuttings are removed in shavings and without the noise given in cutting bone, cannot retain gold fillings long enough to do the dentist credit. This is so in particular of children's teeth, where lateral cavities in the incisors are evidences of immature development. When such teeth are filled, the gold is in contact with living tissue. In the fully-developed tooth the fillings rest mainly upon the mineral portion of the tooth.

In dentine, as in the soft tissues, excessive inflammation destroys vitality of the adjacent parts. Slight excitement stimulates, and nature repairs the injury by calcific deposits. Thus, teeth may be sensitive to thermal changes for weeks and months after filling and finally become comfortable, and the filling will be perfect; but, if there is not sufficient inorganic matter to protect the tissue from any changes injurious to it, inflammation destroys vitality instead of stimulating the pulp to make repairs.

In this case the devitalized surface turns dark and shows through the enamel back of the gold. In a short time the filling must be removed, and, if the dentine is found in no better condition, similar results may be anticipated from another gold filling.

I wish to be understood upon this point: there is a law of success under the first-named condition and a law of failure under the second. This was the fault of discussions upon the so-called "Electro-Chemical Theory." The opponents always chose the conditions to favor their case, and, being true, they had weight with all who could not see the perversion. It may be of interest to state that all teeth of low grade or highly organized ought to be filled with gutta-percha or some non-conducting material until sensitiveness is removed by deposition of lime salts. This may require months, and, in the case of children, years.

I wish to be emphatic upon another point respecting the failure

of gold, which is due to defective manipulation and not to the material or dentine; that is, a leaky gold filling will injure good, sound dentine. Any one can recall the sensitiveness of dentine when poor or leaky gold fillings are removed. Without going into the scientific reasons for this fact, we will say that fluids which surround leaky gold fillings are acid and continue so, which of course dissolves the lime, thus leaving the organic matter exposed and subject to inflammation and subsequent decomposition. It requires but one more process to place a normal tooth upon the same plane as an abnormal one: when the mineral element is taken out, the dentine is in the same condition as a tooth that never possessed that property. This is the secret of success with some in the use of gold: some do perfect work; others cannot. Again, excessive malleting of cohesive gold upon frail dentine will bruise it, and thus give the opportunity for fluid action and secondary decay. For this reason, non-cohesive gold gives the best result as a lining in the hands of most operators. Let it be understood that gold possesses no antiseptic properties like tin and copper amalgam; in its use, perfect adaptation is the only salvation.

I will not add to the length of this paper by considering all the materials used for filling. Once the principle is understood, it may be applied to all the materials. The way out of these difficulties is to come through lining cavities with some material like varnish, in a manner to become a substitute for the lime dissolved.

In using amalgam, if the cavity is near the pulp, or very sensitive, I use gutta-percha stopping dissolved in chloroform. Having the amalgam ready, paint the cavity with the chloro-percha and introduce the filling before the varnish dries, for this reason: if the filling rests upon a thin foundation of gutta-percha, there will be sensation when the plug is submitted to hard biting. When the amalgam is packed before the varnish is dry, all is forced out except that which penetrates the dentine, or is used to fill up the roughened surface of the cavity. At all events, the filling rests firmly upon the dentine, and no circulation can go back of the filling. The amount remaining is so thin that shrinkage by loss of the solvent will amount to nothing.

In large cavities with thin walls in the molars, where the pulp is not in danger, I prefer oxychloride or oxyphosphate linings to gutta-percha, as they make a firm foundation. Oxyphosphate works well used as described for gutta-percha.

In this connection, I will say that a large phosphate filling, if inserted close upon the pulp, will in time destroy it. It may be

years before this will occur; generally, the patient is warned in time to change the filling for gutta-percha, which will correct the difficulty; but, if allowed to continue after the filling has been worn at the edges or has commenced to decompose, the acids set free will devitalize the pulp. In no case have I seen any such action from cavity linings; there is little or no acid to be set free. The lamina is so very thin that it cannot be decomposed and leave a space. Decay rarely occurs around fillings thus lined. On removal of fillings thus inserted, it is almost impossible to separate the filling from the cavity-walls.

This lining is most essential in the use of the higher grades of amalgam, for the reason that amalgam that does not oxidize is no better than gold; it has no antiseptic properties like those contained in copper.

To explain, I will say that in the setting of telegraph-poles some companies wisely bore a hole in the pole above the ground and fill it with sulphate of copper; when the salt dissolves and is absorbed into the wood, more is added until the wood becomes saturated with the oxidized copper: wood in this condition does not decay.

This is precisely what occurs when porous dentine is filled with amalgam: the oxides and sulphides of the metals are absorbed into the surrounding dentine, taking the place of the lime salts and thus arresting decay.

Teeth in a normal condition are not discolored by amalgam fillings, because the structure is so dense that the oxides do not penetrate. The worst feature of amalgam is its shrinkage, which allows circulation and secondary decay. This is not offered as a new practice. It goes to show the importance of understanding the condition of the teeth in relation to the materials used.

I will close with this illustration, which is applicable to the subject before us: On entering a central telephone-office, one sees an immense switch-board with hundreds of brass-lined cavities, all numbered. It is the business of the operator to insert plugs into these cavities as ordered, on call. So long as the order is obeyed, all goes right. A mistake in plugging a cavity sends the current in the wrong direction. Such mistakes are often the cause of much irritation and not infrequently attended with vociferous reflex action.

The dentist, while on duty, has a switch-board before him; he should understand all combinations and be able to make the conditions, so as to secure the right results. Scientific knowledge of this nature is an element of success in saving teeth.

To recapitulate: Social, professional, physiological, and mechanical elements, combined, insure success.

Dentists are classed with the patients and practice that give

them support.

The way to success is open and upward, with ample room above. Progress is the outcome of associated efforts in the higher grades of practice.

Never limit the possibilities of others to the inability of self.

Stand firmly upon the foundation of true merit, without building upon the demerits of others.

Reading presents to the mind many theories; discussions help to obtain facts; clinical instructions are seldom forgotten. Society membership is indispensable, socially, professionally, and protectively. In a literary way, read and take notes, reflect and record facts. In operating, regard each tooth as a patient; diagnose physiologically, prescribe with chemical adaptability, manipulate with mechanical accuracy, and there will be "no such word as fail."

DESCRIPTION OF PROCESS FOR STAMPING PLATES BY HYDRAULIC PRESS.*

BY E. A. BOGUE, M.D., NEW YORK.

WITHIN a few years a material called Spence metal has been devised. This substance is really sulphur and iron. It melts at about the boiling-point of water, and in process of cooling a stage is reached, just before solidification takes place, at which the mass becomes exceedingly fluid. At this stage it can be poured into an impression of plaster or even Stent's composition.

This circumstance has caused Spence metal to be used in the hydraulic press for the purpose of stamping dental plates, as a steady pressure of almost any power may be had by this means. It is also possible to make the swages and stamp a plate within two hours from the time of taking the impression. A description of a case in hand will perhaps best serve my purpose. In the present instance an impression was taken with Stent's material, and all the

¹ Read at the semi-annual meeting of the Massachusetts Dental Society. Boston, June 6, 1889.

rest of the work was done by my friend and assistant Mr. Fred Collett. The impression was chilled with cold water, and sculptor's clay was built up around the margins to the height of one-half inch. A paper could have been wrapped around equally well. The impression then was coated with a solution of soap and water. Into this impression, thus prepared, Spence metal, just before the point of solidification, was poured. This Spence metal was chilled immediately on touching the Stent's composition, so that all contraction took place from the top of the centre downward.

The small die thus made was then provided with three legs made of pins heated and pressed into the metal. These pins held it at just the required height, so that the die, being placed in the middle of the iron ring in which the pressure was to be given, stood at the height required for an additional quantity of Spence metal to be poured into the concavity and around this little die up to the required level. This die, being quite cold, is covered with whiting, and a counter-die of Wood's fusible alloy¹ is poured over it. This fusible alloy melts at a still lower temperature than Spence metal, and it is poured over the male swage by using the heavy iron ring in which the counter-die must remain during the swaging process. This first set of swages being completed, duplicates are made, if required, by taking the impression of the male die and repeating the process of casting the swages as often as may be required.

The Spence metal is exceedingly brittle, so nothing but steady pressure must be permitted. If it should be found necessary to strike blows upon the swage, others must be made of some other material. In the present instance a Babbitt's-metal swage with a tin counter-die was made upon which to break up the plate. The flat plate may be placed between the dies with a bit of glove-kid or rubber dam between the plate and the counter-die, and the flask containing it placed directly in the press. The screw at the top of the press being turned down to give such pressure as is possible from above, the second screw connected with the plunger at the side is then gradually turned inward by means of the large driving-wheel. The manometer is watched, as indicating the amount of pressure that is being given; four hundred pounds to the square centimetre is generally enough, though I have as an experiment run it up to twelve hundred.

 $^{^1}$ Composed of fifteen parts of bismuth, eight of lead, four of tin, and three of cadmium. This forms a silvery-white, granular alloy, which becomes soft at 135° F. = 57° C., and fuses at about 145° F. = 63° C.

During the swaging process the plate should be frequently annealed. When finally down, close to the duplicate swages, it receives its last trimming, its last annealing, and is then put upon the original die that was made directly from the impression. When taken from the press after this final pressure, the fit is more perfect than any struck swages can make it.

For suction-plates it is generally necessary to scrape the centre of the plaster impression and not to put in an air-chamber, the fit of the hydraulic-press plates seeming to be as good as the impressions from which they are made.

STERILIZED SPONGE FOR CAPPING PULPS.

BY T. H. PARRAMORE, D.D.S., HAMPTON, VIRGINIA.

The use of antiseptics and germicides in general surgery led me, a few years ago, to adopt them in dental practice, especially in the treatment of exposed pulps. My method of treatment and the theory upon which it is based I described in a paper read at the meeting of the Southern Dental Association, at Old Point Comfort, Virginia, in 1887. I have had no reason to change my practice since then.

The rationale of treatment is to induce the exposed and irritated pulp to deposit "secondary dentine" at the point of exposure, and not at hap-hazard in any part of the pulp cavity, a propensity all of us have had reason to deplore. In this treatment sterilized sponge serves a double purpose: it acts mechanically, by its presence protecting the pulp against injury by the material used as a filling; for this purpose it is peculiarly adapted, both on account of its aseptic character and of its soft, yielding, non-irritant nature. In the second place, its porous character invites the dentine-forming germinal matter or protoplasm to gather in its meshes and form a covering of secondary dentine where it will protect this delicate pulp, and not, as is so often the case, form pulp-stones, which then become a source of irritation. That sponge does become the seat of deposition of secondary dentine, covering and protecting the nerve from thermal and mechanical injury and preserving the tooth in all its organic vital perfection, I have had good opportunity to prove.

Since I began the use of sterilized sponge (about three years ago) I have treated over one hundred and fifty cases; of this number I have only known of six failures. Nearly all of these cases are in the mouths of patients whom I see constantly, and who would report if there was trouble. Many of the cases I have filled permanently, and in every instance I have found the dentine sensitive when excavating. In almost every case the pulp was at first slightly unhealthy, as indicated by its red, inflamed condition and its propensity to bleed upon the slightest provocation. I have not, however, on that account, hesitated to cap at once, depending upon the use of bichloride of mercury, and no other treatment, before applying the sponge-graft and filling.

In filling, too much stress cannot be laid upon the necessity of thoroughness in every minutia of the operation, leaving nothing to chance. After partially preparing the cavity I apply the rubber dam and complete the preparation, avoiding, if possible, wounding the pulp, but do not allow an unavoidable wounding of the pulp to interfere with the thorough preparation of the cavity. Having my cavity carefully prepared and my dam adjusted, I next sterilize everything that is directly or remotely connected with the cavity, from this point to the completion of the operation; upon this point it is impossible for me to be too explicit or insist too earnestly, for on this more than anything else depends the success of the operation. Now place a small piece of sterilized sponge upon the point of exposure and fill over this with the oxyphosphate. is no necessity for using the oxyphosphate very soft; no trouble need be feared from pressure upon the pulp; the sponge protects it against that.

When the cavity is deep enough to admit of it, I prefer to fill partially with oxyphosphate and finish the operation with guttapercha, for two reasons: gutta-percha is a better protection against thermal changes than oxyphosphate; and, secondly, when this temporary filling is to be removed for the purpose of filling permanently, I have simply to remove the gutta-percha and find my cavity ready for the permanent filling. After allowing the temporary filling to remain for six months or more I fill permanently, allowing enough oxyphosphate to remain to protect the pulp.

PHYSIOLOGY OF TOOTH-MOVEMENT IN REGULATING.1

BY S. H. GUILFORD, D.D.S., PH.D.

In changing the position of teeth in the act of regulating, the surrounding tissues, both hard and soft, are largely involved. In order, therefore, to properly comprehend the philosophy of toothmovement it is necessary to understand the structural character of these tissues and the physiological changes that take place in them while a tooth is being moved.

The Alveolar Process.—This process, as its name implies, is not a separate and distinct bone, but an outgrowth from another. It is a provisional structure designed to support the teeth in position and afford lodgement for the nutrient vessels leading to them. It is formed upon the body of the bones of the jaw as the teeth are developed, growing with them until they are fully formed, and then remaining while they remain.

When the teeth are lost, there being no longer any special use for it, most of this process is absorbed and carried away. In early infancy little alveolar structure exists, but it is formed co-ordinately with the growth of the deciduous teeth, and remains during the period of their retention. Should they be lost before their successors are ready to appear, the process will be entirely removed by absorption, and a new one be formed for the accommodation of the permanent teeth. Where, however, the deciduous teeth are gradually shed to make way for their successors, the process is not entirely absorbed, the basal and unabsorbed portion serving as a foundation upon which the new alveoli are formed.

The process consists of an outer and inner plate united at intervals by septa, thus forming the alveoli for the accommodation of the roots of the teeth. In structure the process is not compact, but open and spongy, somewhat resembling the cancellated structure of the diploe of the bones of the cranium or the inner portion of the shafts of long bones. Its outer or cortical layer is denser and harder than the inner portion. Its cellular structure, while giving it sufficient firmness to support the teeth in their positions, affords opportunity for the lodgement and passage of the vessels of nutrition with which it is so bountifully supplied.

¹ Read at the semi-annual meeting of the Massachusetts Dental Society, Boston, June 6, 1889.

Owing to its peculiar structure and its great vascularity, it is readily resorbed under the stimulus of pressure, and again readily reproduced behind the moving tooth.

The Teeth.—Of the teeth themselves but little need be said. All are more or less familiar with their number, shape, position, and structure. Being the hardest structures of the human body, the application of any force necessary to move them will not injuriously affect them so far as their hard tissues are concerned.

In the moving of teeth, the fact must not be overlooked that while the crown may be moved considerably, the movement becomes less and less along the line of the root, so that the apex is moved but little. This is due to the fact that force can only be applied to the crown, while the apex remains almost a fixed point or fulcrum. In the movement of a tooth, therefore, whether inward or outward, forward or backward, the crown describes the arc of a circle, the centre of which is near the apex of the root.

Teeth with single and short roots can be moved more readily than those with long and many roots, for the reason that in the former case there will be less resistance to be overcome.

The Pulp.—The pulp is the formative organ of the tooth, and after calcification is complete, it remains as the principal source of nutrient supply for the dentinal tissues, especially the dentine.

It is composed of fibrous connective tissue, containing a delicate system of lymphatics, together with numerous nerve-filaments, which enter through the apical foramen. Ramifications of minute blood-vessels are noticeable throughout its whole extent, giving color to the organ, and constituting its vascular system.

It bears an important relation to the teeth in their movement, since it may be devitalized through imprudence or lack of care. Before calcification of the teeth has been completed the apical foramen is large and easily accommodates the pulp where it enters the tooth. After calcification is complete, the apical foramen is small, and the pulp at this point is in consequence greatly reduced in size. In the movement of the teeth there is often a slight mechanical constriction of the pulp at the apex due to the tipping of the tooth in moving. If the movement be rapid in teeth fully calcified (after the sixteenth or eighteenth year), this constriction may be so great as to cause the death of the pulp through strangulation. Before complete calcification this is not likely to occur, from the fact that when the foramen is large the pulp has more space for its accommodation.

In the movement of a tooth in the direction of its length the

pulp may also become devitalized through excessive stretching. This has occurred at times in drawing down into line a tooth that has been retarded in eruption. In all such cases care must be exercised and the movement be conducted slowly.

The Pericementum.—The pericementum—or peridental membrane—is that tissue which envelops the root of the tooth and fills the space intervening between it and the alveolar wall. It is a tough, strong membrane, composed mainly of fibrous connective tissue, permeated with blood-vessels and nerve-fibres, and containing traces of a lymphatic system.

It is strongly adherent to the alveolar wall of the socket, on the one hand, and to the cementum of the tooth, on the other; its adherence being due to the extension of its fibres into both the bone and the cementum. These fibres, according to Professor Black, "are wholly of the white or inelastic connective-tissue variety," and the apparent elasticity of the membrane is due to the passage of the fibres from cementum to alveolus often in an oblique direction, in such a way as to "swing the tooth in its socket."

This membrane is the formative organ of the cementum of the tooth, and also assists in building the walls of the alveoli.

The cells concerned in the building of the bony walls are known as osteoblasts, and those forming the cementum are designated cementoblasts. After these cells have performed their normal function, they become encapsuled, and form part of the tissue they were instrumental in building.

When re-formation of tissue is demanded, as in the thickening of the alveolar wall or in enlarging the normal amount of cementum at various points under certain conditions, new cells are originated to perform the work. In the moving of a tooth the activity of these new cells is at once manifested in the formation of alveolar tissue to fill the space caused by the advancing tooth.

Beside these cells of construction and repair the pericementum also contains cells that might well be called *cells of destruction*. They are the osteoclasts or cementoclasts, and their function is to break down or absorb the cemental or osseous tissues when nature calls for such action.

In the correction of irregularities, these cells perform valuable service in removing bony tissue in front of the moving tooth.

The pericementum is thickest in childhood, when the sockets or alveoli are of necessity considerably larger than the roots of the

¹ Dental Review, vol. i. p. 2:0.

teeth which they contain. With advancing age both cementum and the alveolar walls are increased in thickness by slow but continuous growth until the pericementum is greatly reduced in thickness, and, in consequence, the diameter of the roots more nearly approximates that of the alveoli or sockets.

The pericementum possesses a variety of functions not often met

with in any single tissue of the human system.

It retains the tooth in its socket and acts as a cushion to prevent injury to the adjoining bony structures from hard and violent concussions to which the teeth are sometimes subjected.

It affords accommodation for numerous blood-vessels, which supply the teeth with nutrient material, and for the branches of nerves which constitute it the sensory organ of the tooth, so far as tactile impress is concerned.

It is the organ of construction and repair of both cementum and alveolar wall, and is also, on occasion, the organ of destruction of either or both of these tissues.

Its great importance in the moving of teeth is shown in the fact that without its services teeth could not be altered in their positions without serious injury to themselves or adjoining parts, and if so moved would be useless, because they could not possibly be made firm in their new positions. In other words, the regulation of teeth would be a physical impossibility without the important services rendered by this peridental membrane.

Physiological Action in the Movement of a Tooth.—When force is exerted upon a tooth for the purpose of moving it, the first effect produced is the compression of the pericementum between the tooth and alveolar wall on the advancing side and the stretching of the same membrane on the opposite side: In the compression of the membrane the blood-supply is partly cut off, and the nerves, by their irritation, create a sensation of pain which is soon obliterated by the semi-paralysis brought about by continued pressure. At the same time, this irritation stimulates and hastens the development of the osteoclasts, which at once begin the work of breaking down and absorbing that portion of the alveolus pressed upon.

Bony tissue thus being removed, accommodation is made for the advancement of the tooth, which at once takes place. Under continued pressure this action is renewed again and again until the tooth has reached its desired position. While this is taking place on the advancing side quite an opposite condition prevails on the side from which advancement has taken place. There the fibrous tissue of the pericementum has been subjected to extreme tension;

greater room has been provided for the accommodation of the nutrient vessels, and osteoblasts have been developed for the formation of bony material to add to the alveolar wall, and thus close the space caused by the movement of the tooth. While these processes of absorption and reproduction on opposite sides of the tooth have been going on coincidentally, their results have been very unequal, for the absorption of bone is a far more rapid process than its formation.

During the entire time of moving, and for a long time afterwards, the tension of the pericementum on the free side of the tooth is kept up to such an extent that, were the force of pressure or of retention renewed, the tooth would at once be drawn partly back into the space created by its movement.

The tendency is only finally overcome after the deposit of ossific matter in the alveolar socket has been sufficient to allow the pericementum to resume its normal thickness on that side of the tooth, when, by virtue of the removal of the tension and support of the new bony tissue, the backward movement of the tooth is no longer possible.

While this process of reparative construction has been going on, the structures about the opposite side of the tooth have been adjusting themselves to the new condition. The pressure upon the tooth having ceased, no more bone is absorbed; any injury inflicted upon the pericementum by its continuous compression is repaired; the nerves and blood-vessels resume their normal functions; and the tooth in its new position becomes a far more useful member of the dental organism than it had been.

Having thus reviewed, perhaps not with sufficient brevity, the character of the structures involved and the physiological changes that take place in the movement of teeth, I propose now to call your attention to three important considerations involved in toothmovement that have not as yet been as fully emphasized by writers upon this subject as they deserve to be.

First: the character of power to be applied for the movement of teeth.

In changing the position of a tooth in the mouth we are governed by the principles of applied mechanics, subject, of course, to physiological conditions. Power must be applied, and to obtain it we avail ourselves of the use of such substances as will yield it in proper degree, and fashion and arrange them in a way that will produce the best results. Of the many materials suitable for power-production in the mouth, each has its value, and each its advantages

in certain cases. In some instances the steady and continuous traction of elastic rubber is most desirable; in others, the elasticity of vulcanite or some of the metals; while in others still, the more powerful and interrupted force of the screw will be required. The age of the patient, his physical condition, and the peculiarities of the case will all have to be considered in determining when and where one or the other shall be used.

Viewed in a physiological light, we do not believe that there is any objection to the use of either continuous or interrupted pressure. Each we hold to be equally good in its place. It is not so much a question of the character of the force applied as it is the quality of it. If a certain movement is difficult of accomplishment, on account of the firmness of the teeth or of opposing influences, we use the screw in some of its forms; not because by its use we obtain a period of rest after a period of action, but because it yields the greatest amount of power.

So too, in a simple movement, we may often accomplish our object most advantageously by the use of a rubber band, on account of the simplicity of its application and operation, and not because the character of its action is continuous.

As to the amount of power to be applied in any given case, that will depend upon the judgment of the operator and a proper trial. If found to be too great, it can be lessened; if too little, it may be increased. The progress of the case and the comfort of the patient will determine the matter. The amount of power suitable for cases in general cannot be reduced to a scale or formulated into the law.

What is needed in all cases is the maximum of movement combined with the minimum of pain. The discomfort of the patient is a far better indication of the application of excessive power than anything else can be.

The most successful practitioner in this line of work is he who recognizes the relative value of the different power-producing appliances, whose judgment, unwarped by bias, indicates which it is better to apply in any given case, and whose ingenuity can so contrive and arrange them that they will yield the best results to both patient and operator.

The second is that of persistent force in tooth eruption.

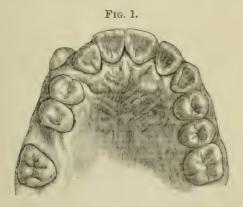
Each tooth has a definite position assigned it in the arch, and this position it will occupy unless prevented by accidental circumstances. In seeking its position it is guided and directed by that inscrutable law of nature which governs and controls the development of every part of our physical frame, and it is impelled in its

course by that power or force of nature which lies back of every physical movement.

These facts are familiar to us all; but do we often stop to consider the quality or power of this impelling force? When there are no hinderances, the tooth in the course of its eruption glides so gently and easily into its position that we are apt not to realize the power that is behind it; but when there are obstacles in the way that tend to prevent or hinder the full or normal eruption of the tooth, we see nature putting forth her full powers in endeavoring to remove or overcome them. If the impediment be of such a character that nature cannot overcome it, the tooth must either become imprisoned or remain but partially erupted. More frequently, however, nature will not allow herself to be entirely defeated, but by continuing to exercise her power the tooth will be compelled to assume a position as near the normal one as possible. In this way irregularity of position in the human teeth generally occurs.

Singularly enough, this power, lying back of the erupting tooth, is greater in certain teeth than in others, and its greatest manifestation is found in connection with the cuspids.

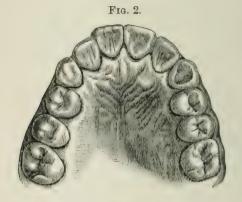
The wonderful force sometimes exerted by these teeth in endeavoring to gain their true position in the arch may be well illustrated by a case in the practice of the writer. (See Fig. 1.)



The patient was a young lady, about fifteen years of age, in whose upper jaw a cuspid had erupted outside of the arch, causing an unsightly projection of the lip. All of the other teeth were properly aligned, but the bicuspids and molars, on the affected side, were somewhat in advance of their true positions, and there was conse-

quently very little space in the arch for the accommodation of this cuspid. The first molar, on the same side, was badly decayed, so it was decided to extract it as a preliminary to making room for the misplaced tooth. An appliance was then attached to the second molar and second bicuspid, intended to draw the latter tooth backward. The patient left with the fixture in position, and did not return until eighteen months later, when it was noticed that both bicuspids had moved backward, and the cuspid occupied its proper position in the arch. (See Fig. 2.)

It transpired that the appliance, having caused some pain, was removed by the patient two days after it had been placed in



position, and the case neglected. The correction of the irregularity had been entirely accomplished by the cuspid forcing its way into place and crowding bicuspids backward in the effort.

This case shows how nature sometimes succeeds as a corrector of irregularities.

In view, therefore, of what nature is able to do and will do towards bringing about a harmonious relation of the teeth, would it not be well for us to assign her a more important part in the regulation of teeth than we have been in the habit of doing? So important an ally should not be underrated or overlooked.

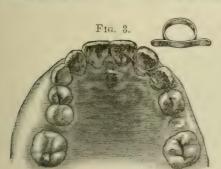
If our patient be deformed by too close a bite, let us insert a plate in the roof of the mouth with which only the anterior teeth of the lower jaw can come in contact, and in a little while nature will elongate the posterior teeth sufficiently to give us any desired opening of the bite. If a cuspid remains but partially erupted, or lies outside of the arch, let us make room for it, and it will lose no time in assuming its proper position. And if some of the teeth are

crowded and locked out of position during the earlier period of second dentition, as is frequently the case with the inferior incisors, let us wait and see what change nature will bring about through enlargement of the arch and persistent power before we interfere with our mechanical agencies.

The third and last consideration I have to offer is that of securing immobility of teeth after regulating.

A retaining appliance, to be in the highest degree efficient, should be as light and simple in construction as possible; it should be non-removable; it should afford the least opportunity for the retention of food or secretions; it should be as inconspicuous as possible, and, last and most important, it should hold the teeth firmly while they are becoming fixed in their new positions.

With these requirements in view, the writer was led, many years ago, to devise certain appliances for retaining teeth almost immovably. So far as he is aware, they are the only ones that meet all of the requirements enumerated; and although, in their present state of development, they are not applicable to nearly all the cases that come to our hands, they are adapted to so many of the simpler forms of irregularity as to make them almost indispensable. They are an outgrowth of the original idea of the Magill band, and consist of gold or platinum bands, either single or in couples, to which are attached spurs, bars, or wires, to lie in contact with or bear upon other teeth in such a way as to secure absolute rigidity

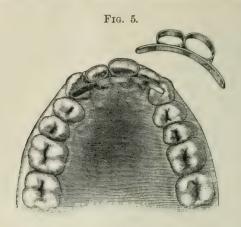


of the teeth to be retained. They are secured in position by cementing the bands to teeth selected for the purpose.



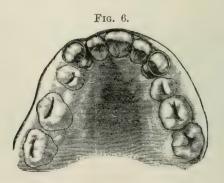
In the models before you may be seen some of the many ways in which they are formed and applied. In Fig. 3, the band, with small bar attached to rest against adjoining teeth, holds in position a cuspid that had been moved inward into line; in Fig. 4 a band, with single spur, retains an incisor that had been rotated; still another, consisting of two bands joined at their points of contact,

was used to retain two centrals that had been rotated in opposite directions. A modification (Fig. 5), consisting of two bands joined to an extension bar, held in position two incisors that had been



drawn inward to close a space caused by the loss of a tooth; while on another model (Fig. 6) you may notice two bands joined by a thin platinum wire to serve the same purpose as the preceding one.

After teeth have been moved into proper position and retained there by the herein-described appliances until new walls have been



formed about them and the osseous tissue becomes thoroughly calcified, the teeth will henceforth remain in their new positions without extraneous aid. The importance of properly retaining teeth after regulation can scarcely be overestimated, for in many cases, after all the care and labor of regulating, the good results

have been lost by a too limited period of retention. The length of time required for holding teeth in position before permanent retention is assured varies with each case, but a shorter period than six months should never be allowed. It is, however, not only the length of time that has to be considered, but the character of the retention as well.

A broken bone, after being set, is retained in rigid splints by the surgeon, not only to assure proper apposition of the fractured ends, but also to enable the reparative process to go on more quickly. So, when new alveolar process is to be built up about teeth, it is very evident that this operation will proceed rapidly or otherwise in proportion as the teeth are firmly held.

Most retaining appliances are of such construction that they must necessarily be removed at times to free them from the *débris* of food and the accumulation of vitiated secretions. Every time such appliance is removed and replaced the teeth are necessarily more or less disturbed in their positions, and, if the appliance be removable by the patient, there is no way of preventing him from removing it at improper times, should be feel so disposed. These conditions constitute a valid objection to removable retainers.

The results secured by the above method of rigid retention have been so satisfactory as to fully confirm us in our preconceived idea that the principle was the correct one for use in all cases.

Reports of Society Meetings.

MASSACHUSETTS DENTAL SOCIETY.

THE semi-annual meeting of the Massachusetts Dental Society was held in Boston, June 5, 6, and 7, 1889.

Wednesday, June 5 .- Afternoon Session.

RESPONSES OF DELEGATES.

Dr. George W. Lovejoy, Montreal, Canada.—It affords me great pleasure to be with you at this meeting. I was at your meeting last year, and enjoyed myself very much indeed. The exhibit of dental appliances is a new feature, and is certainly of great benefit to all who attend.

Dr. Magee, St. Johns, New Brunswick.—I am a young member of the profession, and came here to learn. I am very glad to be with you, and thank Dr. Merriam and you all for the invitation to attend.

Dr. B. H. Teague, Aiken, South Carolina.—I am afraid Dr. Merriam has taken a liberty with me in asking me to make an address. I did not expect to be the speaker from South Carolina. The original speaker has either been engulfed in the floods or been kept at home on account of affliction; and yet South Carolina has never been called upon in the past but what she responded in some way or other,-right or wrong. It is with some feelings of intimidation that I am here among you. It was said down South that, "if such a little rebel as you get up there, some of those big Yankees, like Cooke, will overhaul you." I said I knew something about the Yankees; in fact, I had learned a great deal about them, for my father-in-law was a New-Hampshire-born man, and a practitioner of dentistry for many years. His name is familiar to a great many, and I must say that what success I have had in life has come from the teachings of that good old Yankee preceptor. Gentlemen, he was a shrewd old man. He did not exactly make me a student, but he claimed that I should stay with him three long years. I stayed the three years, and rather think the old gentleman got the best of me; but, by marrying his daughter, I got the best of him.

Now, sirs, my practice has been mostly among Northern people. I live at the little town called Aiken, visited by many of your unfortunate sick people. In the mouths of these people I have seen very little work that I would be ashamed of, and a great deal that has spurred on my ambition. I have not come here to show you anything great, but, as the gentleman said, to learn, and I hope that in the proceedings of your meeting I shall be filled with all I can digest.

Dr. J. N. Crouse, Chicago.—It affords me great pleasure to be in Boston again. It has been a number of years since I was so far East, as my recreation takes me westward. I am glad to see so many of my old friends again. A number I see around me looking as they did ten years ago, having grown a little gray, but just as smiling as ever, and they make you feel just as comfortable when they take your hand. I came a long way to this city, as one of the speakers said, to learn something. I get rusty at home, and then, when I get where I think I do not know as much as other practitioners, I strike out and come East, and pick up knowledge here and there, and get whatever I can. Even if it does not go to my head,

I can put it in my pocket and take it home with me. I tried to persuade some of my Western brothers to come with me, but could not prevail on them. I shall certainly carry back with me many new and profitable things to tell them when I go home. I brought with me a big satchel so that I could carry along anything that I got, and you need not be afraid of overloading me, for I could get a trunk, and I will be ready to receive anything that the New England and Massachusetts Dental Societies will be willing to give me.

Dr. S. H. Guilford, Philadelphia.—The city of Philadelphia (and, perhaps, I may say the State of Pennsylvania) sends greetings to the Massachusetts Dental Society in its present meeting. It also sends its well-wishes for its success. Personally, I regret very much indeed that there are so few representatives here from my own city. The meetings of your Society are well known all over the country. I know in Philadelphia it is a pleasure to read of your proceedings, published in our dental journals, and I know many more would be benefited if they had concluded to come to this meeting. Your Executive Committee have the happy faculty of bringing everything here, and doing good with it, so that when we come here we feel that we are not only to see you personally, but what you have been able to gather.

You have also added a new feature to your meetings, and that is, the idea of bringing the profession in contact with the manufacturer or first dealer. That, I think, has never been done before, and the credit surely belongs to this Society. It is an important matter, and brings many persons to your meeting. All interested in teaching young men in the colleges understand the importance of keeping abreast of the times, not only with regard to the theory and practice of dentistry, but also in the important matter of materials used in dentistry. The student must not only be taught to practise, but he needs to be put in direct communication with the manufacturer, and this is the first occasion where I have been able to gather such information. I wish you every success in the meeting.

Dr. G. L. Chewning, Fredericksburg, Virginia.—There are moments in life when the emotions of the heart cannot be adequately expressed. Your call upon me to respond for Virginia is so unexpected that I am unable to respond as I would like. But, gentlemen, in behalf of the Virginia dentists, allow me to say that, if you will give us the opportunity, we will welcome you to our State, to our "roof-trees, our hearth-stones, and our firesides," as

well as to our hearts. My own desire is that, should you visit our old State, your every moment may be as pleasantly and profitably spent as my time in Boston has been. I thank you warmly for your kind expressions and for the cordial welcome you have extended me, in all of which I most heartily reciprocate.

Dr. S. B. Palmer, Syracuse, New York.—I consider it an honor to be appointed a delegate from the central part of New York, and I think there is something due this Society above the confession of that honor. I accepted the invitation to attend because I could not afford to stay away; and am thankful for being here, where we can obtain our supplies, as has already been referred to, and to accept your proffered hospitality and to know a fact which, as mentioned by the president, may be of some advantage to us,—that this Society is a committee of the whole to look after our interest and keep us from going astray. I thank you kindly for your courtesy.

Dr. G. F. Cheney, St. Johnsburg, Vermont.—I thank you very much for the invitation. You appear to be well represented, and everything points to an instructive and successful meeting. I had the pleasure of attending your meeting last summer, and the remembrance of it is a bright spot in the events of the year.

Dr. Hayward, New Hampshire.—A New Hampshire man would have known better than to call on me for any remarks. I had the pleasure of attending for the first time the Massachusetts Dental Society twenty-two years ago this month. At that time I was just entering your ranks as a student, and since then, although I have been plodding away among those New Hampshire hills, I have always been a student of the Massachusetts Dental Society. Your meetings have always been a source of profit to me, and I am heartily glad to be with you here to-day.

Dr. J. Bond Littig, New York City.—It is not necessary for me to say, Mr. President, that New York sends greetings. Our interests are closely allied, and you know, from visiting our societies in New York, that we are all friendly towards you. I know I get a good many good things here, and I expect to get a good many more things from Dr. Merriam.

Dr. Geo. A. Maxfield, Holyoke, Massachusetts.—I think I can say, at least for the members of our Society, that we are glad to attend this meeting, for only those who have labored in getting up these dental meetings know how much there is to do, and now this summer we have given up our semi-annual meetings, and are going to enjoy yours. I thank you heartily for the invitation.

Dr. Frank Harrison, Sheffield, England.—It may be interesting to you to know somewhat of the history of dentistry in England. I was present at many of the meetings of the Dental Reform Society when the great strife was being made to get dentistry recognized by our state. Up to within a few years ago any one could practise dentistry, without any degree whatever, but our Dental Diploma Committee managed to impress upon Parliament the necessity of some state recognition, and, accordingly, it was got with considerable modification. Of course, as you know, they had to recognize any one who had any claims. At the present time the Dentists' Register is giving us the greatest amount of trouble. At all our meetings we have placed before them the importance of clearing and keeping it correct.

Our Association meetings are divided into two sections,—a political and a scientific section. The political part of our meeting takes place first, and in that we discuss the general position of dentistry; those who should, and those who should not, be recognized; or any infringement of the "Dentist Act." Such, I presume, you have to a limited extent, although not quite so public; your meetings being of almost an entirely scientific character.

Another subject now coming to the front is the qualifications of young men,-whether they shall simply become dentists and then surgeons, or surgeons and then dentists. Some contend that the dental should be separate from the medical profession. Of course, our diploma is granted by the medical body-"Licentiate Dental Surgeon"-and not by dentists. Another topic is the formation of a higher degree in dentistry. In our colleges in England we have various degrees, and many consider that the degree of "L.D.S." is not sufficient; that there should be something higher for those who wish to distinguish themselves in dental studies; and that a distinction in dentistry should be made. That, I believe, will take much of the time of the annual meeting to be held at Brighton in August next. A man who is going to study surgery has to take up four years of his life in pursuing the curriculum and getting ready for his examination. In these four years he may also take up dental subjects, and obtain both the degree of M.R.C.S. and also the dental diploma; so we rather look forward to that as one thing that will place dentistry in England on a higher plane.

Dr. Oswald Fergus, Glasgow, Scotland.—I am very glad to be here and accept this invitation of your president to say a few words. You can scarcely imagine the pleasure I have in being back in America again.

At home, after the passage of the "Dentist Act," there was a great rush for registration, with an accompanying want of qualification. Before its passage a man might be working in a blacksmithshop to-day and to-morrow be put on the register. Young men could go to certain licensing bodies and pass their examination and sign the curriculum without any college training or education whatsoever; yet dentistry was called at home a "learned profession." It seems to me that, if a diploma is worth anything, young men—no matter what their experience had been—should not be allowed to receive it without having gone through a prescribed curriculum of three or four years, as might be necessary.

With regard to this higher degree, we would very probably find the same thing occurring if we were able to get it,—that men who signed the curriculum would be put on the same footing as the higher degree men.

Another thing I am glad to see here is the practical part of the work. You gentlemen are very kind; you not only tell us how a thing is done, but you bring your patients here and show us how to do it; and if we cannot pick it up it is our fault and not yours. I had a good view of your clinics, and shall always be grateful to the members of the Society for the kindness shown me. I was an absolute stranger yesterday,—knew no one. Now I go back with many more friends than I thought possible to become acquainted with in so short a visit.

DISCUSSION ON DR. PALMER'S PAPER, "ELEMENTS OF SUCCESS IN DENTAL PRACTICE."

Dr. I. J. Weatherby, Boston.—I was quite interested during the reading of the paper, and am in agreement with its general contents, but when he struck the vein of "copper amalgam" I was disturbed. It seems to me that we should have sufficient skill to save teeth without resorting to the blackness of darkness which is produced by copper amalgam. I am a positive man, and no one will take offence.

Some little time ago I was called upon to remove a copper amalgam filling from the mouth of a lady,—a superior right first bicuspid, mesial surface. I asked the patient why it was inserted. She told me that it was the dentist's choice. I said to her, "It is not always safe, perhaps, to leave the choice of matters to the dentist, in justice to yourself." The surface of the filling was black, and every time she opened her mouth there was a black sheep in the

fold. It was removed, and all know how hard they are. It was drilled out, however; and when a gold filling was inserted she was delighted.

I have practised dentistry now for over forty years and have had no occasion to resort to the use of copper amalgam. You will remember, gentlemen, something like forty-five years ago the first society of American dentists organized put its foot down very severely on amalgam, inhibiting its use entirely; but they, of course, carried the matter too far. The amalgams of to-day are better than were the silver and quicksilver,—made by filing up a quarter,—which turned black, but preserved the teeth as well as copper amalgam.

Now, the introduction, in 1885, of copper amalgam is as much worse than Townsend's amalgam as this latter formula is worse than gold; and yet Townsend's was an improvement on the old amalgams. If skilfully used, the improved amalgams are a success, and are to a certain extent an improvement on Townsend's amalgam. In my opinion, the latter, even, is far preferable to copper amalgam. It is claimed that copper amalgam will preserve teeth that other amalgams will not. I assert that other amalgams will do the same thing. The main fault is in the manipulation. No patient with an amalgam filling leaves my office for an hour to an hour and a half after the filling has been inserted. The burnishing of the amalgam after it has crystallized is the great secret of success.

- Dr. S. B. Palmer, Syracuse, New York.—I think I should know something about copper amalgam: I would not consider it right if I did not understand it, after the personal experiments I have made. The paper does not advocate it. I stated that eighty per cent. of carious teeth could be filled with gold. I think that is fair. The balance of twenty per cent. must be filled with something, and we do not know as yet whether copper amalgam is better than any other, or whether it is worse.
- Dr. G. L. Curtis, Syracuse, New York.—Will Dr. Weatherby state why the filling was removed?
- Dr. I. J. Weatherby, Boston.—Because it gave such a demoniacal character to the other teeth in the jaw that the lady was perfectly disgusted and horrified that she should receive such treatment from a dentist.
- Dr. G. L. Curtis, Syracuse, New York.—I am glad, gentlemen, it was not because the tooth had decayed, and I therefore do not look upon the argument as a very strong one. Regarding the un-

sightliness of copper amalgam,—black ebony looks very pretty when polished. I think that we, as dentists, should practise with a view of preserving the teeth, and regard the appearance—the artistic effect—as a secondary consideration.

Dr. L. D. Shepard, Boston.—There is an element of success which the essayist has spoken of, but which he did not enlarge upon. I would like to present it in a little stronger light. I have noticed it in the experience of the last two years in examining men -mainly graduates of dental colleges-for license to practise dentistry in Massachusetts. The most noticeable feature has been an inability to reason correctly from conditions to results, and to adopt the proper treatment. I have been struck with the fact that young dentists—and, to a less extent, older dentists—do not receive what seems to me the fundamental principle of education,-a knowledge of how to reason, how to discuss the reason for a certain condition being as it is, and the best steps to take to secure success, and why. As an element to the highest success in practice, it seems to me that it deserves prominence, perhaps, above any other essential. Without enlarging upon it, I simply give it as my observation in the examination of between thirty and forty dentists in the past two years. Some of them received degrees from our best colleges, and some were in practice ten and twenty years. I shall enlarge upon this later on, and I consider it a very important point in dental education.

Dr. J. H. Alexander, Mystic River, Massachusetts.—It does seem that, with all the wise heads here, some one ought to give us some thought in reference to this amalgam question that would straighten out some of the knots that seem to be in our paths. This question has been discussed by many, and often in such a way as to be of little advantage. There is one thing that seems to operate upon our patients, and that is the manner in which we speak of other men's work. I think it is unjust to state to a patient that a thing is wrong unless we know it is absolutely wrong.

Dr. F. A. Cooke, Boston.—I am glad the question of copper amalgam has come up, and I am desirous of learning all that I can in reference to it. It should be argued for the benefit of the younger men, who are striving to do what is right, and they should have the benefit of the knowledge and experience of those who have been longest in the profession.

In a mild way I have taken to using copper amalgam,—using it according to directions, and according to the light I have so far received. I have made observations and tried to inform myself

regarding it. I am glad to hear the idea of using a varnish over the dentine before inserting the filling, for all these things bring out points that I think should be known if there is value in them. There are one or two points I would like to be informed upon; and one is the electrical effect of copper amalgam coming in contact with a gold filling, and another is whether there is any constitutional effect coming from the chemical action in the mouth that will act deleteriously. I have had several patients lately—men learned in the sciences—that I have worked for, using copper amalgam; and I have felt called upon, before inserting the filling, to state that it was copper, and that it was being tried. They have closely questioned me sometimes, and to my disadvantage, having the advantage of me in their superior knowledge of chemistry; and I would be glad to receive any light on the subject you may have to offer.

Dr. J. N. Crouse, Chicago, Illinois.—The two great elements of success, in my opinion, are strict integrity and perseverance, coupled with the proper judgment of what seems wisest and best to do under the circumstances,—perseverance until the desired end is accomplished. The second point is the one brought out by Dr. Shepard,—a knowledge of the reason for a thing. A dentist ought to be logical. If I hear a man talking illogically on a subject, I know that if he is illogical in his reasoning he will be illogical in his practice. If you are going to have the brightest success, you must do the best for your patient first. If upon close observation you find your patients indifferent and careless in their habits, and you have performed a good operation that needs to be cared for, you must educate them to the necessity of cleanliness and try to elevate their standard in this respect, or your best work will prove a failure,—especially where there is a predisposition towards caries. I believe in contour-work where the part is decayed, or lost by caries, and to restore the shape of the tooth as originally formed by nature. If this is done, the patient can masticate food properly; whereas, if widely separated, the teeth, in many instances, are sources of discomfort. There is no comparison to be made between the two methods of operating for the comfort of the patient; but if they are not cleanly, and do not appreciate your efforts, your work will be in vain, and it scarcely matters what you fill the teeth with,you will have constant failures.

The paper said that eighty per cent. could be filled with gold. I don't know that I would put it as high as that. Gold, however, stands pre-eminent as the superior of all other materials. It will

save more teeth than anything else; but it requires the strictest integrity and determination to insert it properly. In preparing a cavity, if, after it is completed, you use a magnifying glass on it, and detect a little chalky line running across the cavity,—extending beyond where the cavity has formed, perhaps up the cervical margin,—you will have to remove this or you will have a failure.

Regarding the question of copper amalgam, it is too soon, I think, to give a positive opinion. In my opinion, it is the first amalgam brought to the attention of the profession that looks as though it would save teeth. I haven't used a great deal of it, but have watched it carefully. It is the first amalgam I have seen, that, after being inserted for a few years, has seemed to preserve the edges of the tooth perfectly. I had the pleasure of examining four or five patients of Dr. Dean's, and the fillings are standing beautifully. I think it is the coming amalgam. I have never seen any amalgam that looked very well for color, and do not recommend copper amalgam on that account. The time may come when we will consider ebony the prettiest color; but if I was a young man, and a young lady opened her mouth and showed her teeth filled with black amalgam,—well, I should have preferred that they were filled with gold.

Regarding gutta-percha, I have had the theory advanced to me that gutta-percha expands in teeth,—that, instead of shrinking, it enlarges. I have seen cases where it seemed to me that it did so. I throw this out as a query in order to get the experience of those who live where great knowledge comes from,—Boston,—get the experience of the men in this "land of knowledge" on this subject. I have seen pivot teeth set with gutta-percha, and it looked very much to me as if there was expansion of the gutta-percha. Some claim that it expands enough to split the tooth. I would like the experience of my friend Palmer and others on that subject.

Dr. Charles S. Butler, Buffalo.—I came to Boston to attend the meeting of the Massachusetts State Dental Society, expecting to find a great many things, but I did not expect to find the "color line" drawn so closely here as it has been. Perhaps, had our friend from South Carolina not left the room, he could have obtained some benefit on the color line in the subject of copper amalgam. I am very sorry that this copper amalgam, upon which the paper merely touched, should be singled out as the one question for discussion. There are many good points in the paper that are being lost sight of. One point was the earnestness of the essayist in treating the subject; and we can all emphasize the words of Dr. Crouse in re-

gard to the necessity of application and earnestness in our profession, and the determination to find out what is the best thing. This is what the young men want, and it is a fundamental principle underlying all success. If I have anything to say in regard to copper amalgam, it is to query regarding its color,—is it much more unsightly than a highly-polished gold cap upon the first bicuspids? It does not seem to me to be so. Possibly our education will so advance that the time will come when we will think as well of the copper amalgam as we do now of the highly-polished gold caps.

Dr. T. H. Parramore, Hampton, Virginia.—I was much impressed with the point made regarding the examination of cavities after you have prepared them. Time and again I have found the imperfections, which cannot be discovered with the naked eye. Another point I think should be touched upon,—that of the thorough finishing of fillings after they are inserted, and here also we must have recourse to the magnifying glass. If we do not remove overlapping gold, we are bound to have failures, just as much as if we leave a jagged edge in the cavity. Run up closely under the margin, and see if any of the fine threads of floss silk will catch in the filling at the cervical wall. That is an important point in the filling of any approximal cavity.

I have experimented somewhat myself regarding this copper amalgam, but cannot say yet whether it is a proper thing or not. I am favorably impressed with it: it seems to adapt itself better to the walls of the cavity than any other amalgam I ever saw, whatever the results may be. I am waiting for results, and I think it will prove to be a great benefit to us as dentists, and also to our patients.

I take this occasion to say that I am very glad to be with the Massachusetts Dental Association.

Dr. Oswald Fergus, Scotland.—I have used copper amalgam for the past nine years, and found it to be a good filling material. In many of our hospitals this amalgam is much used. I do not know what superior it has. True, in cases where the filling is conspicuous its color is objectionable, but, if you will take cavities where the filling material is not seen,—in molars and wisdom-teeth,—I do not think much can be said against it. I would not, however, advise its use in every mouth. It should not be put in the hands of students and novices. The student should be taught to use gold, and if he can use this well he can work anything well.

Dr. I. J. Weatherby, Boston.—The color line here is very pecu-

liarly drawn, as touching amalgam fillings. I do not care myself to confess to people that I cannot save teeth as well with gold as I can with amalgam. Any teeth you can save, that will bear filling with copper amalgam, I will fill with gold, and will continue the life of that tooth as long as with amalgam. I give you this challenge.

Dr. Charles S. Butler, Buffalo.—I had a patient that came to me ten or twelve years ago, with teeth that I could not fill with gold. I filled with amalgam, and stated that it might last three years, but how long was uncertain; these teeth are doing good service to-day, and I do not see why they should not last ten years more. I freely admit that I could not have done it with gold, but others might have done so.

Dr. George A. Maxfield, Holyoke, Massachusetts.-One thing regarding success, that has not been taken up, is the "money" part of the question. I say any man who will think of money first is not fit to belong to the dental profession, but it is a thing we all have to take into account. I do not think the essayist set the percentage at all high when he stated that eighty per cent. of the teeth could be filled and saved with gold. I think ninety per cent. would not have been at all too high. It takes skill, and skill can do it with gold, but with the majority of our profession their practice is not such that they can always use gold. While I was at college Dr. Webb was giving a clinic, and he made this remark to the students: "Do not, gentlemen, put in anything but gold, even if you have to pay for it yourselves." That, of course, was nonsense. A great many people in moderate circumstances come to us, and cannot afford high charges; vet it is our place to serve them, and what are we going to use? I answer, just that material that will make a good filling and save the teeth, and come in a line with their pocket-book.

I have used copper amalgam some, and experimented a great deal with it. I stated a year ago, when we discussed this subject, that Dr. Miller, one of our best workers, tells us copper amalgam is the only filling material around which germs will not live; and I think it is settled that caries of the teeth is caused by germs, or at least they are a factor. We want to do all we can to limit the development of organisms. We all find places in the mouth which the majority of persons do not keep clean,—approximal cavities in molars. In all such cases I place copper amalgam at the cervical border. It is said that copper amalgam does not unite with silver alloy. I am of that opinion myself. Last week I placed in a filling on the approximal surface of a second molar, and had to remove

it yesterday because of inflammation of the pulp. I found my silver alloy came out with a clear ring from the copper. In using amalgam my patients cannot afford, and I cannot afford, to take the time that Dr. Weatherby does with an amalgam filling.

I am glad the discussion has taken the turn it has. It shows the deep interest in copper amalgam. It is coming into prominence, but a great many who are using it do not know how to manage it. Failures are the result, which should not be charged against the material itself.

Dr. George F. Waters, Boston, Massachusetts.—Of all men in the world, a company of dentists ought to understand the reason for a certain procedure. Why should copper amalgam be used, and what is the effect of it?

One evening, last winter, I was present at a meeting of the Boston Society of Natural History, and some facts that were presented seemed to have a bearing upon the question, and I reported the matter to the editor of the International Journal; I think it was in the last number. A railroad had been laid from Boston down to one of our summer resorts, and workmen were at work cutting away the side of a hill. They came upon some Indian graves, and Prof. Putnam was sent for to see if there was anything worth saving. When he examined the graves he found Indian skeletons, interred there in such a way as to indicate that there had been some kind of an epidemic and that a large number had been destroyed.

In one of these graves was found a skeleton with a piece of copper bound over a portion of the head, and the integument, the hair, the skin, and the bone had been preserved,—no decomposition there, notwithstanding the rest of the skeleton was far gone. An important feature was that the brain was preserved and had shrunk up under the bone that was protected by the copper,—the copper salts having saturated it and passed through. The wrappings that were taken from that bone—the vegetable matter,—fibre, matwork material, etc.—were preserved, so that they have them now, showing the texture and method of making.

We all know that arable soil gets its fertile power from the ability of certain microbes to separate from the atmosphere nitrogen, and that when they come in contact with vegetable matter that matter is decomposed. It is arranged so as to serve the purpose of coming plants. What was the effect of this copper there in protecting these substances from the various low organisms about them? Here is a point for you to ponder on in regard to copper

amalgam,—whether it has not the same power in the mouth. These skeletons had lain in that condition for more than two hundred years, and still, while substances that ordinarily decompose, they were preserved.

Subject passed.

Thursday, June 6.—Afternoon Session.

DISCUSSION ON PAPER, BY S. H. GUILFORD, D.D.S., PH.D.,—"PHYSIOLOGY OF TOOTH-MOVEMENT IN REGULATING."

Dr. H. A. Baker, Boston, Massachusetts.—To say I was interested in Dr. Guilford's paper does not express my feeling. There were two points touched upon about which too much cannot be said. One is the tendency of nature to do her own work. I believe if we give nature a chance she will do more towards regulating than we can do with all the appliances we in our ingenuity can make. If patients are taken when they are young enough, and the teeth trained as they are erupted, there is no need of regulating them. Nature will do the work.

Another subject of interest to me was the point of retaining teeth. This, I think, we should all consider. I have seen more trouble from retaining-plates than irregularities themselves; and if we can make fixed retaining appliances which will be cleanly, and, at the same time, fixed,—so the patient cannot remove them,—we will succeed much better. There is one little device which, so far as I know, is original with myself, and has proved of great value in retaining overlapping centrals after regulating: It consists of a little gold bar from one-eighth to three-sixteenths inch long. It is applied with oxyphosphate cement, and is a very simple and effective appliance. I have a case of four front teeth overlapping and out of line, and they are retained by this band alone.

Dr. W. X. Sudduth, Philadelphia.—The essayist stated that a cuspid forced itself into place. I do not think the tooth had the power in itself to accomplish the movement. The tooth was a passive object, and was forced into place by the action of the lip. The lip on the outside tends to constrict and force the teeth backward. The shape of the arch is largely due to the action of two forces. The tongue on the inside pressing out and the lips on the outside tending to constrict. The form of the tongue has much to do with shaping the arch. The restrictive action of the lips is also well known.

An illustration of the strength of the orbicularis or muscle was shown in a case in my own practice some years ago, in a lady patient with overlapping central incisors. When she first came to me deep lines were noticed running down from the alæ of the nose, producing a pursed condition of the lips. Since then she died of a malignant disease,—carcinoma of the uterus. At that time she was evidently suffering more or less from the disease, and it gave her an expression of pain manifesting itself in the compression of the lips; and as a result of the constriction of the orbicularis muscle we had the teeth crowded. The arch was widened and a gold plate inserted as the only thing that would prevent a return of the original irregularity.

Dr. S. C. G. Watkins, Montclair, New Jersey.—I think the case which Dr. Sudduth speaks of is illustrative of other conditions than those of regulating teeth. I know the case of a child that has been under my care from birth. At birth and up to the third year the child had a perfectly-formed and normal arch; but it acquired the habit of breathing through its mouth. The result has been that the muscles, in the effort of holding the mouth open in that way, are drawn down over the teeth, and the arch is decreasing in width and becoming narrow, so much so that you cannot do more than place your finger in the centre of the arch: the child is now nine years of age. There has been a radical change in the shape of the mouth, and from no other reasons than mouth-breathing and the force of these muscles on the side of the mouth.

Dr. Sudduth, Philadelphia.—In this case, the mouth being held partially open, as is the case in all mouth-breathers, the expansive action of the tongue is lost, the tongue in such cases lying on the teeth, and nothing opposing the constrictive action of the lips, hence the narrow arch.

Dr. H. A. Baker, Boston.—Can Dr. Watkins explain any cause of the mouth-breathing?

Dr. S. C. G. Watkins, Montclair, New Jersey.—By an injury to the nose the cartilage was pressed in on one side, so that the nostril was almost closed, making breathing through the nose difficult. The child, not being old enough to know the necessity of persisting in the proper manner of breathing, adopted the easier mode, with the result as I have stated.

Dr. T. H. Parramore, Hampton, Virginia.—In my practice 1 have a patient, a boy thirteen years old, who has gotten into the habit of sucking his under lip. This pushes the lower teeth back and the upper teeth out, so that when he closes his mouth there is

a distance of one-quarter to one-half inch between the upper and the lower teeth. I would be glad to know how to remedy it. He sleeps in that way, and, except when he is talking and eating, he is continually practising this habit. It has made the upper arch very sharp. I have tried to correct it, but have never been able to do any good.

Dr. C. H. Hayward, Peterborough, New Hampshire.—A short time ago I had a lady, one of whose canine teeth had erupted out of position, there not being sufficient space between the bicuspid and lateral incisor. She had never paid any attention to it, and was thirty years of age when she sought advice regarding it. Finally it got so bad that whenever she laughed her lip would catch up there and annoyed her exceedingly. I told her it was possible that it might come down if she would let me take out the bicuspid. I extracted it a year ago last March, and, with no force except that of the lips, this tooth has come down into position.

Dr. I. J. Weatherby, Boston.—Regarding the case mentioned by Dr. Parramore, I would take an heroic course. I would make a gold plate fitting upon the under teeth, pushing them out, and attach to the plate barbs, with which he might amuse his under lip at leisure. I think he would soon be cured. Any attempt at the old practice would be met by the stern sentence, "Thus far shalt thou go, and no farther."

Subject passed.

Friday, June 7 .- Morning Session.

DISCUSSION ON PAPER BY E. A. BOGUE, M.D., NEW YORK CITY,—A "DESCRIPTION OF MAKING CASTS AND DIES, AND PROCESS OF SWEDGING."

Dr. R. R. Andrews, Cambridge, Massachusetts.—The screwpress for plates I have used for some time, and would not go back to the old way. I had mine made by a blacksmith, who charged me twelve dollars for it. Elsewhere, I suppose, it would have cost thirty dollars. If you experience the pleasure of getting a perfect fit, when the impression is all right, you will be well repaid for your trouble.

Dr. E. G. Leech, Boston.—I think for the past eighteen years I have never struck a blow on a gold plate to swedge it. The press I use is made of wrought iron, except the base. It is made with a screw, like that of Dr. Andrews,—of steel, engine-turned. In swedging a gold metal plate you cannot be as sure of results in any other way as with the press that carries it home without rebound,

there being no resistance. On the last pressure place a thin piece of cotton cloth underneath your plate, as your first work will expand your counter-die, and the cloth makes up for expansion and makes a perfectly tight counter-die; your plate will be driven home, and a perfect adaptation the result.

Subject passed.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, April 6, 1889, at the hall, Arch and Thirteenth Streets. President Kirk in the chair.

Dr. Kirk introduced the subject of perforation of the antrum in implantation, and possible pathological results.

Dr. Kirk.—At the February meeting, when Dr. Ottolengui read his paper, I was compelled to leave, and I feel that I did not get the full benefit of what was said. As the subject of the antrum in its treatment is of importance to all of us, and as I have had some experience in implantation, I want to speak further upon the subject. Dr. Ottolengui reported a case where the antrum was accidentally perforated. An excessive hemorrhage followed, and, in order to stop this, he inserted the tooth, and allowed the patient to remain with the tooth in position for ten days. Symptoms of septicæmia set in, and the patient was in a critical condition for some time. The case was treated by a physician in connection with Dr. Ottolengui, and she was restored to health in due time.

The inference that Dr. Ottolengui drew, or that was drawn by those present, was that the operation of implantation was directly chargeable for the unhappy result that followed. In my remarks on the paper, which were hastily made, I tried to bring out the point that the operation of implantation in that case was not, a priori, to be charged with those unpleasant results, for the reason that he had a hemorrhagic disease to deal with, and the antrum filled with blood, which was allowed to remain there and decompose, and set up the attack of septicemia which followed. I took the ground that such a result might have followed the extraction of a tooth, or any procedure that would expose the antrum. I further said that I did not believe that the mere perforation of a healthy antrum by an instrument during the operation of implantation is a dangerous proceeding. My reason for this is based

upon these points. The antrum, as you all know, is lined by mucous membrane, which is contiguous with that which lines the oral cavity and naso-pharynx. It is not closed, but is open to contact of air, the same as any of the respiratory passages are; so that it is not to be classed with the closed cavities of the body, where the inflammation may arise from the sudden ingress of air. It already exists there, and the catarrhal inflammation of the lining membrane of that cavity is not to be looked upon as a serious matter at all. I think we have it very much more frequently than we suppose. I can recall half a dozen cases where, passing up the canal of bicuspid teeth, the broach has passed beyond the apex and entered the antrum. Now, in such cases as that, when inflammation of the apical end of the bicuspid of a suppurative character exists, there is no doubt that the discharge that flows into the antrum is local in its expression, and probably is never noticed.

My attention was called to it when a gentleman came to this city from Scranton, and I was asked to extract what I called a reasonably good six-year molar. Dr. Harrison Allen said, "I want you to extract that tooth, because I have determined it is the cause of an antral catarrh. I had my doubts about the necessity of extracting it. If I had no knowledge of the nasal difficulty, I would not have done it. I did as he asked me to do. In passing a broach through the socket on the palatine root, I found it readily passed into the antrum. He asked me to make a much larger opening. which I did with a drill that was spear-pointed and almost threesixteenths of an inch in width, and he proceeded to wash the antral cavity. The patient had suffered for ten years with nasal catarrh. Dr. Allen asked him to return the next Sunday, one week later, to have the treatment renewed. He received a letter two weeks later, the man saying he did not come, as requested, because the catarrh was entirely well, without any trouble. Here was a case of alveolar abscess resulting from the apex of the palatine root, where the discharge was through the antrum and out through the nose, -one of those cases that frequently occur. It was a case that was confined to the apex of the root, and the mucous lining of the antrum was not involved. It is very probable that the inflammation set up at the denuded apex of the root extended to the entire lining membrane of the antrum. There can be no doubt that the proper treatment in such cases is to remove the cause of the trouble and extract the root, or, if possible, remove the cause of the abscess, and, after removing it, treat the mucous lining of the antrum with antiseptics and sedatives.

The antrum affords a good lodging-place for vitiating secretions. Where they are irritating and thrown off, it becomes bad, because the inflammation goes on to the formation of necrosis of the interlining bone; but, in all cases where the disease is non-malignant and purely of a chronic inflammatory character, get access to the antrum in all its parts, and treat it by washing out with proper medicines. I wish to have the thought relating to Dr. Ottolengui's operation and its possible pathological effect upon the antrum confined to cases of a non-malignant character. I do not see why the perforation of a healthy antrum should result in the slightest difficulty. I have had more experience in this. I have reported in the current number of the Cosmos where I have had the antrum opened twice, and so far as to get it healed: there was difficulty in keeping it from healing. The first was taking some tissue from the floor of the antrum,-made a one-fourth-inch opening, and union took place in three or four weeks afterwards. I have never yet failed where I have tried to get it closed. The man died from tuberculosis before it got well.

Now, if there is a danger in opening the antrum, I would like to have it brought out. It seems to me that too much stress is laid upon opening into that cavity, and if any gentleman knows where an injury has occurred I would be very glad to hear from him.

Dr. James Truman.-I do not agree with Dr. Kirk that there is no danger in opening into the antrum. I have had some experience in that direction, and I have never been able to close up readily the artificial opening. I have had several cases where it was impossible to close it up, and it continued for several years, always annoying to the patient. It seems to me that there is a practical difficulty in the way. If you make an air-hole into the antrum of, say, one-fourth of an inch, it assumes different proportions, and I do not believe that new bone will be developed to close up that opening. It occupies, in my view, very much the same relation as an alveolar abscess, although, as a secondary abscess opening into the soft tissues, it is not liable to give pain. If it is simply covered up with a development of soft tissue, without a closure, as I understand closure, there is a difficulty in keeping food from getting into the antrum. I have had to make plates in order to guard against this; otherwise constant syringing would be required.

The objection I made the other evening was simply in the implantation of teeth, as the operator might readily enter the antrum.

If this is going to happen often, then it is time to sound a warning note to prevent the careless operations of novices. I have no doubt Dr. Kirk's cases are all true, but he may get hold of one where there is some systemic difficulty that he is not aware of, and the irritation set up in the living membrane may become chronic. Possibly his cases may have all been healthy systemically, but this cannot always be.

Dr. Faught.—I am very much interested in the possible pathological results of implantation. One of the retarding features to the practice is, possibly, the complication of the antrum with certain relationships. I cannot agree with the statement of Dr. Kirk in reference to the communication of the antrum with the outside air. The atmosphere has not the same free ingress and egress to this cavity that it has to the other portions of the respiratory tract. Then, again, we must always remember the relation which the antrum bears to the immediately adjacent tissues,—the orbit of the eye, the frontal sinus, etc.,—for these relationships make it extremely important how we act. I agree with Dr. Truman that there may be trouble from antral relationships. I have had some experience with antral cases. The openings into it have been usually the result of extraction, and, while they are not serious, I rather dislike to approach them, knowing the trouble of keeping the cavity clean. To my mind, the greatest difficulty in antral cases does not arise from contact of air so much as from the contact of other foreign substances. In treatment, the opening is often unduly enlarged by careless treatment. I do not think we should make an opening as large as mentioned by Dr. Kirk, but you must have it large enough to cleanse the cavity. The quicker you can bring the tissues into position and induce healing, the better it seems to me to be. In the several cases I have had in difficult positions, I never had any trouble in getting them to heal.

Dr. Head.—I think Dr. Kirk meant to say that it is not dangerous to perforate the antrum for the purpose of implanting a tooth. If that is so, Dr. Truman's and Dr. Faught's objections to it have no good grounds, for the reason that the tooth, when implanted, grows to the adjacent tissues. The tooth cannot give rise to alveolar abscess; because the apex is filled with gold, it is impossible for any material to enter into the canal which could give rise to inflammation afterwards; therefore, if Dr. Kirk makes a hole in the floor of the antrum for the purpose of implanting a tooth, he immediately afterwards fills that hole with a substance which, by growing to the adjacent tissues, will act as a perfect plug.

Dr. Register .- In my judgment the antrum is so placed anatomically that there should be very little fear of penetrating it. When it does happen in a healthy mouth, I can see no reason why serious consequences should follow the operation. The antrum of Highmore is nothing more than a sinus for the purpose of producing lightness of bony tissue, and in the cavity is reflected a mucous lining, the same as through the internal parts of the body. It is so formed that the mucus secretions pass out with very little obstruction except in some catarrhal troubles, and in these there is sometimes a foreign accumulation. My only apprehension, where the antrum is perforated, would be in the apex of the root of the tooth passing into it, and thus be a source of irritation that would in time cause nature to throw out the tooth; it would prevent the natural processes from absorbing the pericementum in a regular way, it being an action which is followed by a reaction. With few exceptions, I think there is very little danger in entering the antrum, certainly not enough to prevent any one from performing the operation.

Dr. Tees.—During a practice of many years I have never yet met with a disease of the antrum, and for this reason my views coincide with Dr. Kirk's,—that it is hardly possible that inflammation could be set up in that cavity from merely piercing it with a drill. The many cases of extraction of diseased molars would frequently bring to our attention troubles in this cavity if inflammation so easily supervened.

Dr. Guilford.—I am much pleased with the paper, and also with Dr. Truman's remarks. I am happy to say that, not having implanted any teeth, I have never perforated the antrum in that way.

I think there are some here who would be glad to talk upon the subject of abscesses. Each one has had his quota of cases, and I have had some failures. I think that possibly some word regarding these might instruct others and prevent their having similar results. One failure I met with happened not long ago. I was in New York City and attended the meeting of the Odontological Society, when a paper upon diseases of the antrum was read by a gentleman from Baltimore. He recommended that the tooth should not necessarily be extracted for the purpose of gaining access to the antrum, but that it should be penetrated by drilling through the alveolar septum, between the teeth. The method was approved by Dr. Atkinson and others. In my next case I tried drilling up through the alveolar process into the antrum. I failed, because the

opening was not large enough to relieve the antrum of its contents. I do not think we have room enough to make the opening sufficiently large. Another mistake is injecting into that cavity liquids that are too strong,—such preparations as chloride or sulphate of zinc, used in strength. I have had the best success with a five-percent. solution of carbolic acid, which is all the acid that water will take up; also with sulphate of zinc, five grains to the ounce. Have the hole large enough to treat, and do it with mild remedies in weak solution, and repeat it every day or two. In the early days of my practice, a gentleman in good health presented himself for treatment. I entered the antrum through the socket of one of the molars, and each day injected a five-per-cent. solution of carbolic acid. A cure was effected in two weeks' time. What I want to impress is the use of mild remedies. There is such a thing as stimulation, and such a thing as over-medication and irritation.

Dr. Tees.—Have you met with many cases of diseased antrum outside of the clinics of the dental college?

Dr. Guilford.—I have had in my office practice, extending back over twenty years, about eight or ten cases.

Dr. Faught.—I am glad that Dr. Guilford mentioned this point, for I believe that in antral trouble there is danger of overmedication. In holding back the tissues I like a straight instrument, and one point to remember is to have it perfectly smooth. You do not want a sharp, penetrating instrument, but such an one as comes in Dr. Flagg's filling set No. 5. This you can pass through the opening and with it gently push away the tissues and enlarge the opening, producing no irritation, and then wash out the cavity with a syringe. I certainly believe that nitrate of silver and many other forms of medicaments recommended in the books do more harm than good. A prescription I like very much is listerine, diluted. Also, a weak solution of Pond's extract has been a pleasing remedy to me,—on one occasion, Pond's extract and a very weak solution of phenol sodique mixed.

Dr. James Truman.—The antrum is not a perfectly smooth cavity inside. If you will examine a number of skulls you will agree with me that it is almost impossible to drain it, no matter how you make the hole. There are ridges there that prevent it being thoroughly emptied. If you syringe in strong solutions, you will have them remaining there, and it is likely to be a source of constant trouble. I agree with the gentleman that it is poor practice to use strong solutions.

Dr. Place.-I have had but one experience in opening into the

antrum, and that was a short time ago. I was called in to see a gentleman who was very low with consumption. He had had a six-year molar extracted to relieve him of an abscess. The dentist, after extracting the tooth, had bored through the process into the antrum, and, as a result, produced an opening between the molar and bicuspid one-quarter inch in width, from which issued a very offensive smell. When I first saw it he had it stuffed full of cotton. I suppose in such a case there is not much to do but to keep it properly drained and treat antiseptically; but it occurred to me that the dentist, after extraction, might have removed too much of the process, and by reason of the patient's anæmic condition could not get a healthy granulation to heal it.

Dr. Register.—Regarding the cleansing of the antrum, I have had several of these cases, and the difference in result between the use of the syringe and the atomizer in applying medicinal agents is so much in favor of the atomizer that I now recommend it to all of these cases.

As Dr. Truman rightly puts it, the interior of the antrum is not a smooth cavity: instead of its being regular in shape, it is rather the opposite, and it is impossible in treatment to properly cleanse that cavity by using a simple syringe and applying a very little force in that way; but in the use of the atomizer, with great force back of it, the air being under pressure, and using the medicinal preparations in a weak state, it is easy to cleanse it of all accumulations, which, by decomposing, would possibly lead to necrosis. I have used it in three or four cases, and the results were satisfactory in the extreme.

Dr. Head.—Does the gentleman sterilize the antrum?

Dr. Register.—I only use the liquid mixed up in the atomization with the air.

Dr. Kirk.—The one point of interest to me in this matter is that formulated by Dr. Head, who said, "If Dr. Kirk makes a hole in the antrum for the purpose of implanting a tooth." That is the text I want to preach on. I do nothing of the sort. In all the operations I have performed, I have never perforated the antrum, to the best of my knowledge. I take special care to prevent it. I measure the depth of the drill, and afterwards use the reamers. If a perforation has taken place, then it is the size of the first drill I use. I do not consider a perforation of that size a dangerous proceeding, because the cavity is immediately plugged up by a sterilized tooth.

Cases of antral catarrh are more frequent than we have any idea

of. People are going through life with what they suppose a mild form of catarrh, discharging from the nostril, and it may scarcely be sufficient to excite their notice. I have seen a number of cases depending upon abscessed condition of the roots of some teeth. which were in close relation to the antrum; and it has become a practice when treating these cases to ask, "Have you any nasal discharge on that side?" And I have sometimes been told that they had; they believed it was a nasal catarrh. There is a case of alveolar abscess I have now,-a second bicuspid that came to me in the last stages of suppurative inflammation. The face swelled up. and I applied remedies to the gum over the apex of the root. The swelling afterwards went down. I think time will show a discharge into the antral cavity. Where we have cases of abscess of the second bicuspid or palatine root of the sixth-year molar, and pain suddenly ceases, I think, in a majority of cases, you will find the discharge has gone into the antrum. I had a case of antral disease where all the treatment failed. A more thorough exploration of the cavity revealed a growth of tissue, so placed that it was impossible to introduce medicinal preparations properly. I broke down that wall, and then it got well.

Regarding such strong remedies as chloride and sulphate of zinc, you can use them diluted without producing destructive inflammation, a solution of two or three grains to the ounce not being dangerous.

In regard to the character of opening made into the antrum for exploring purposes, nearly all cases of antral trouble I have had have been where there was one or two teeth missing. The sort of space I would make would be on the buccal side of the ridge, up pretty high, and through the soft tissues in a way that it would form a flap for healing afterwards. I have never had any difficulty in healing.

Subject passed.

Editorial.

THE AMERICAN DENTAL TRADE ASSOCIATION.

For some time past we had been intending to prepare an editorial on the operations of the American Dental Trade Association. and did so for the June issue of the Journal, but it was crowded out in the "clean up" preparatory to a change in printers. we said "that, after investigating the plan of organization and practical working of the Association, we were fully convinced that, instead of its being a detriment, it had been a real benefit to the profession, since, by its influence, better business methods had been established: a better feeling and fairer dealing exist now between its members than previously. The constant reduction in the price of burs, socket instruments, and gas shows that it is in no sense a trust or monopoly." We have come in contact with the members of the Association the past year, and have been afforded every opportunity to observe the operation of the rules governing the Association, and, so far as we can judge, they are fair and just as between men engaged in the same business. There is only one clause in the Articles of Association that has any appearance of being exclusive, and that is the one relating to new members. This can be, and has been, sometimes so used as to prevent the admission of good men who desired to enter the retail business. If this clause was liberally interpreted there would be no reason to condemn the action of the Association.

While we say this much in favor of the Association as a body, we cannot help admitting that there is a wide-spread feeling in the profession regarding certain averred abuses connected with the business of manufacturing dental supplies. This feeling has to a great extent been misdirected in the past, but the publication of the explanation will tend to set the profession aright in the matter.

We therefore gladly give space to the circular, hoping that it may have the desired effect, and correct any misunderstanding regarding the purposes and aim of the Association. We cannot, however, help thinking that it would have been better had this been done when the organization was first accomplished, for its publication at the present time may have a different effect from that

expected by some members of the Association, by directing the attention of the profession from the main body to individual members, and may thus be the means of raising questions that may be rather difficult to answer. Although abuses do exist, their correction does not lie in attacking the American Dental Trade Association.

CHANGE OF ADDRESS.

ONWARD and upward has ever been the watchword of the publishers of the Journal, who have spared neither pains nor money in the past to make it the best dental journal published in America. The present number begins a second year under our management, and we do not think that any one can say that we have not made each succeeding issue better than its predecessor,-a step in advance. There has been nothing to deprecate in the quantity or quality of the matter furnished during the past year, but we have not always been satisfied with the typography and press-work. We have now made a change in printers, and hereafter the JOURNAL will be issued by the well-known and thoroughly reliable house, The J. B. Lippincott Company, 716 Filbert Street. We feel that there can now be no fault found with the JOURNAL in any respect, and that the matter furnished will be presented in the best dress that is possible for any journal to obtain. The old and familiar pen, scroll, retort, skull, and name-"Independent Practitioner"-will be discarded, and a plain but bold face presented for your approval. The INTERNATIONAL will be just as independent as when it bore its former title.

The full-fledged Journal is now before you, having cast off the last vestige of its previous habiliment. You have witnessed its evolution during the year past, and now behold the spirit of our dreams. What is your verdict? Is it worth another year's subscription? for that of some of our readers expired with the June number. We have sent you the July number in order that you might see the Journal in its new dress before we cross your name from off our subscription-list, which we shall surely have to do, if we do not hear from you before the August number is out. Send in your subscription for another year, and invite one of your neighbors to join you. You can send five dollars just as easy as two dollars and fifty cents. Please note the change of address, 716 Filbert Street.

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PLATINUM GROWING SCARCE.

The increased demand for platinum during the past few years has tended to raise the price very rapidly, and the last eighteen months has seen a rise of two dollars an ounce. It has doubled in value in the last decade, with the consumption increasing; and, with no new fields being discovered, but one natural result can follow, and that is, a very marked further increase in price in the near future. The increased demand is not so much due to its enormous consumption in the manufacture of teeth as to its adoption in the electric-lighting process,—every glass globe containing a coil of platinum wire.

Platinum is the only metal thus far known that can be used for pins in the manufacture of porcelain teeth; the source of supply is confined almost entirely to the Ural Mountains, in Russia; some little has been discovered in South America, but none worth speaking of. Considerable money has been spent prospecting for mines wherever indication seemed to point to the discovery of the ore, but so far without any tangible results. In addition to the scarcity of the article, the entire product of the world is in the hands of a powerful European syndicate, which manipulates the market at will and controls prices.

The increase in the price of the metal can have only one result, and that is to raise the price of teeth or drive the manufacturer out of business. This specially relates to the so-called cheap teeth, which have during the past few years been so much improved, some grades having reached that state of perfection that the price can easily be advanced and yet compete with the higher-priced teeth; but other manufacturers will no doubt be forced to retire from business. Unless some means is found to substitute other metals or methods of manufacture, we very much fear that the dollar tooth will become a thing of the past.

WORD FROM BERLIN.

The chairman of the section on Dental and Oral Surgery of the American Medical Association received a telegram from Dr. Busch, of Berlin, to the effect that dentistry has again been recognized as a specialty in medicine by the establishment of a dental section in the Tenth International Medical Congress. This makes the third time

by as many different countries. So that if there is any truth in the old saying the dental section is now put on a firm basis. The adoption of a dental section in the next congress allays the fears of some of the most prominent advocates of a separate dental congress, who were confident that the German authorities would not recognize dentistry. Their doing so, however, is the best evidence that this conservative people are not unappreciative of the merits of the claims of dentistry to be a specialty of medicine.

ENGLISH WIT.

A WRITER in one of our English contemporaries comments rather sarcastically upon an American editor who signed himself as "Editor and Bus. Manager," suggesting that it "smacked of that carryall commonly seen upon the streets." There is an old saying that "brevity is the soul of wit," and in the above signature there is "more truth than poetry," for those who have had the pleasure of experiencing the labors of a position indicated by ye editor's title know full well that he is not only a "common conveyance," in many instances, but a "free hack!" at that.

BIBLIOGRAPHY.

Merck's Index of Fine Chemicals and Drugs, comprising a summary of whatever chemical products that are to-day considered as being useful in either medicine or technology, with average values and synonymes affixed. First American Edition. Published by E. Merck, manufacturing chemist, Darmstadt, Germany; American branch, 73 William Street, New York. Price, \$1.00.

This is a very valuable addition to our list of technical books, and is well worth the price as a reference hand-book on chemical and pharmaceutical terms alone, to say nothing of its other valuable points. The common name for all drugs is given in connection with the chemical name, so that no one need fail in finding the article desired.

HOME GYMNASTICS FOR THE WELL AND SICK. By E. AUGERSTEIN, M.D., staff physician and superintendent of the gymnasiums of the city of Berlin, and G. Eckler, head teacher of the Royal Institution for training teachers for gymnastics. Translated from the eighth German edition by Berthold Schlesinger, Brookline, Mass. Houghton, Mifflin & Co.: The Riverside Press, Cambridge, Mass.

The book is just what it purports to be,—viz., a guide for persons in search of healthy, rational exercise. There has been need of just such a work, that would indicate to all scientific rules for physical culture which did not involve the purchase of expensive apparatus. Too much stress cannot be laid upon the necessity for methodical exercise upon the part of all persons confined to sedentary occupations and to those who are convalescing. The book is fully illustrated, engravings being made to take the place of long, tedious descriptions. A complete index of all the figures found in the text is placed upon a separate plate for ready reference.

Part First gives a description of all the exercises advised, while Part Second prescribes their application in the case of invalids. We can fully recommend the book to all.

Dental Science: Questions and Answers on Dental Materia Medica, Dental Physiology, Dental Pathology, and Therapeutics. By Luman C. Ingersoll, A.M., D.D.S. Second Edition. The Wilmington Dental Manufacturing Co.: Philadelphia, Pa., 1889.

The fact that this book has reached its second edition shows the need of some such work, and justifies the author in his conclusions regarding this particular method of imparting instruction. The work does not pretend to be a treatise, but is more of a compendium, embracing the fundamental principles which underlie scientific dentistry as the author sees them. We were somewhat surprised, however, to see the reproduction of the author's ideas of the dual character of the pericementum after the somewhat rough handling this theory has received upon the part of scientific men in the profession. The chapter on Dental Pathology and Therapeutics should rather be termed Dental Practice, as it does not comprehend pathology. The author's ideas regarding suppuration and pus-formation are obsolete, so also are his theories regarding decay of the teeth. In the statement (page 106) that the direct connection of micro-organisms with decay has not been proven, the author denies the results of the work of Dr. Miller, or else is not acquainted with

the painstaking researches of the latter gentleman: the germ theory of decay has been conclusively proven.

The book is in reality the condensed notes of Dr. Ingersoll, which were used by him while lecturing upon the subjects therein contained in the Dental Department of the University of Iowa, and reflect the observation and studies of this well-known teacher during many years of active practice.

HYGIENE OF THE NURSERY. By LOUIS STARR, M.D. Second Edition. P. Blakiston, Son & Co.: Philadelphia, 1889.

Dentists are often asked to recommend some work on the care of children's teeth. While the above book does not profess to be a manual on the subject, yet it contains some very good advice to mothers. The direction on page 147, as to how to remove the "dark-colored scum which forms at the junction of the tooth and gum," is thoroughly practical, but in this day of specialties seems a little out of place, because of the fact that with it is not coupled the further advice to consult a dentist in case of any tendency of the teeth to decay. The book is a good one and has gone through a second edition, and will form a valuable addition to your library.

OPERATIVE DENTISTRY. By THOMAS FILLEBROWN, M.D., D.M.D. P. Blakiston, Son & Co.: Philadelphia, Pa., 1889.

This work, by the well-known author, forms one of a series of text-books which are in preparation under the auspices of the National Association of Dental Faculties. The series comprises a number of text-books, written by men whom the committee has thought best able to prepare them. The task assigned Dr. Fillebrown was not an easy one, since no special work on operative dentistry had ever been written, and because of the further fact that no strict line of division has ever been drawn between operative and mechanical dentistry. Some criticism has been passed upon the author because so much space has been devoted to crown- and bridge-work, some holding that the latter, if not the former also, should be classed with mechanical dentistry. Be that as it may, nearly every dentist who in years past has confined himself to what he considered operative dentistry has found himself forced in the last few years to take up crown- and bridge-work to the exclusion of large contour fillings, and the fact seems to justify the author's action of including them in a treatise on operative dentistry.

The work is embellished by 330 wood-engravings, a large proportion of which bear the trade-mark of the S. S. White Dental Manufacturing Company. The author has been somewhat severely

Editorial.

criticised for allowing the trade-mark of instruments to have remained on the illustrations, not because of the special house favored, but because of the fact that the book necessarily becomes more or less an advertising catalogue of that house. In this instance it might seem to an outside observer that there were no other instrument-makers in America but the S. S. White Dental Manufacturing Company, or that the exclusive privilege of illustrating the book had been let to that company; either of which conclusions would be erroneous. The book, on the whole, is well gotten up, and reflects credit on the author and publishers.

DENTAL MEDICINE. By FERDINAND J. S. GORGAS, A.M., M.D., D.D.S.

By the same publishers as the above. It is a deservedly popular book, and has now reached its third edition. The author has brought the work up to date in regard to the latest methods of practice, and the use of antiseptics is fully set forth. No dental student, or dentist in practice who desires to be more than an accomplished artisan, can afford to be without some such work in his library. We can heartily recommend Gorgas's "Dental Medicine" as a hand-book especially adapted to dental practice.

For Harris's Principles and Practice of Dentistry, revised and edited by Dr. Gorgas, and published by Blakiston also, we cannot give such hearty approval. It does seem that the day has passed for such works, which, as is stated by some reviewer, "savor of the 'Family Physician' without that book's adaptation to the family needs." There is much that is good in the work and also much that has not been digested,—an incongruous mass that needs rigid overhauling before it can be brought into shape for assimilation.

Geo. S. Davis, Detroit, Mich., sends three copies of the Physicians' Leisure Library Series,—The Radical Cure of Hernia, by H. A. Marcy, A.M., M.D., LL.D.; Bright's Disease, by Alfred L. Loomis, M.D.; and a translation of Professor Ziemssen's Memoir on Pulmonary Tuberculosis, by David J. Doherty, A.M., M.D.

The mention of the names of these authors is alone sufficient to indicate that the subjects will be well handled. This deservedly popular series of brochures is issued monthly, at the very modest price of \$2.50 per annum, or twenty-five cents per copy.

We are also in receipt of the Index Catalogue of the library of the Surgeon-General's Office, United States Army, Volume IX. A ponderous volume of over one thousand pages.

Foreign Correspondence.

TO THE EDITOR:

Incidents of practice are ever-welcome reading, because every now and then occurs a case which, to the best of us, presents a difficulty pro tempore, and is only to be conquered by a happy inspiration not to be met with in text-books.

Such a case presented itself to me the other day. A patient came complaining of hypersensibility of the second right upper molar. It stood alone, occluding with its fellow below, was slightly loose, had no decay, but so sensitive to heat and cold—on account of the roots being denuded—that eating and drinking was simply a misery. I tried all the means I knew to reduce the sensibility, but without avail. Killing the pulp or extracting the molar were means I hesitated to employ except as a last resource.

The suggestion of wearing artificial teeth did not meet with his approval, by which means the tooth would have been covered with the plate, and would have no doubt improved the situation. I took, as an experiment, cotton-wool and mastic, and tied a strand around the molar; the result being satisfactory, I took an impression of the molar with wax—being preferable to modelling compound on account of the temperature necessary—and made a very thin shell of vulcanite perfectly fitting the tooth to the margin of the gums, leaving the crown exposed for the purpose of articulation.

The shell or overcoat, cemented on with oxyphosphate, has been in wear a month, and has completely frustrated contact with heat or cold. I may say it has proved a success. By such simple means I have been enabled to save the molar alive and receive the thanks and confidence of my patient.

H. H. EDWARDS.

MADRID, SPAIN, May 20, 1889.

Domestic Correspondence.

TO THE EDITOR:

At the semi-annual meeting of the Massachusetts Dental Society, held in Boston, June 5 to 7, 1889, the following resolutions of respect were passed upon the death of Dr. F. Searle, of Springfield:

"Resolved, That the Massachusetts Dental Society, in the death of Dr. F. Searle, has lost an old and valued member, whose influence was always exerted to elevate the profession and increase its usefulness. The Society recognizes the great value of his services to the community in which he lived for so many years, and also his generous contributions to the theory and practice of our art, the result of his thoughtful study and investigations. We mourn the loss of a friend and father.

"Resolved, That a copy of these resolutions be sent to the family, the Springfield papers, and the dental journals.

(Signed)

"L. D. SHEPARD.

"R. R. Andrews,

"G. A. MAXFIELD,

" Committee on Resolutions."

At the semi-annual meeting of the Massachusetts Dental Society, held in Boston, June 5 to 7, 1889, the following resolutions of respect were passed upon the death of Dr. Leon Rideout, of Lynn, Massachusetts:

"Whereas, The all-wise Father has removed from our ranks our friend and associate Dr. Leon Rideout, of Lynn, Massachusetts:

"Resolved, That, in the death of Dr. Rideout, this Society has lost one of its most valued members, a man of excellent judgment and skill in his profession, interested in every movement tending towards its advancement, one who was highly esteemed in the community in which he lived and eminently successful in his calling. Genial in disposition, beloved by all who knew him, his presence will be missed from among us.

(Signed)

"S. G. STEVENS,

"A. W. HOWLAND,

"S. F. Нам,

" Committee on Resolutions.

"EDGAR O. KINSMAN, Secretary of the Society.

"CAMBRIDGE, MASS., June, 1889."

TO THE EDITOR:

I thank Dr. Rhein for his sharp criticism of my queries in regard to the operation performed for Dr. Andrews by Dr. Ottolengui. The questions were asked to elicit more light.

Dr. Rhein will permit me, however, to observe that I do not admit, as he says I do, that abraded surfaces on the cutting edges of "incisors" present a most inviting field for "bacteria to promote caries."

Any smooth surface that can be kept free from deposits on every side is practically free from caries so long as it is kept clean.

E. A. BOGUE.

New York, June 11, 1889.

TO THE EDITOR:

At the annual meeting of the New York State Dental Society, held in the city of Albany on May 8 and 9, 1889, the following-named were elected officers for the ensuing year: J. Edward Line, President; W. W. Walker, Vice-President; F. T. Van Woert, Recording Secretary; H. G. Mirick, Treasurer; C. L. Curtis, Correspondent. Board of Censors: William Carr, William Jarvie, S. D. French, W. H. Colgrove, S. B. Palmer, A. M. Holmes, Frank French, and A. P. Southwick.

F. T. VAN WOERT.

TO THE EDITOR:

Would the average practitioner be justified in the extraction of a superior temporary cuspid, at the age of nine and a half years, for the purpose of making space in the regulation of "axioverted central incisors," the lateral being subsequently pushed towards the space vacated by the extracted cuspid? (See Cosmos, p. 231.)

Is it not very probable that the permanent cuspid will be crowded out of the arch?

Why not cut away the crown of the temporary tooth sufficiently to gain the needed space?

Current News.

Dr. A. H. Thompson says that it is a very erroneous impression to suppose that cement will not be durable under porcelain inlays. If the piece is accurately ground, the crevice is so very small, and the cement clings so tenaciously to tooth substance, that moisture cannot penetrate, even at the margin of the gums. In its conserving properties it is absolutely superior to any other filling material.

DR. THOMAS, Des Moines, allows his porcelain inlays to project considerably from the outline of the tooth until the cement has thoroughly hardened. He then grinds it to the proper contour and polishes. He says that at the distance of three feet from the patient his fillings cannot be detected, if of the proper shade. This is the most difficult point to attain. If there must be any difference, let the filling be darker than the tooth, rather than vice versa.

Dr. Whitefield, with his "instantaneous-break" dental engine, which can be run at from two or three hundred to seven thousand revolutions per minute, removes sensitive dentine at a single sweep, while the patient is bracing himself to endure it; hurting less than the touch of a toothpick. He considers high speed the best obtundent.

TEETH that have been intolerably sensitive to thermal changes under gold fillings are found to be perfectly comfortable with porcelain inlays.

THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

ORANGE, N. J., June 15, 1889.

The next meeting of the National Association of Dental Examiners will be held in Saratoga, N. Y., Tuesday, August 6, 9.30 A.M., and at other times during the week, between the sessions of the American Dental Association. It is important to have every State Board represented.

FRED. A. LEVY, D.D.S., Secretary.

AMERICAN DENTAL ASSOCIATION.

The twenty-ninth annual meeting of the American Dental Association will be held at Saratoga Springs, commencing at 10 o'clock A.M. Tuesday, August 6, 1889.

GEO. H. CUSHING, Recording Secretary.

AMERICAN DENTAL SOCIETY OF EUROPE.

The American Dental Society of Europe will hold its annual session at 8 Boulevard des Capucins, Paris, on August 6. Papers by Drs. Miller, Sachs, Bryan, Patton, Elliott, Chamberlain, Haskell, and Fay, and clinics by Drs. Bonwell and Mitchell.

PENNSYLVANIA STATE DENTAL SOCIETY.

The annual meeting of the Pennsylvania State Dental Society will meet at Cresson Springs, Cresson, Pa., July 30; session to last three days. An interesting programme is promised.

R. K. Filbert, Corresponding Secretary.

PENNSYLVANIA STATE DENTAL EXAMINING BOARD.

The Pennsylvania State Dental Examining Board will meet for the transaction of business at Cresson, Pa., on Tuesday, July 30, 1889.

Persons who intend to come before the board for examination are requested to notify either the president or secretary.

W. E. Magill, *President*, Erie, Pa. I. C. Green, *Secretary*, West Chester, Pa.

THE JOHNSTOWN CALAMITY.

 $W_{\mathbf{E}}$ gladly give space in our columns for the following appeal:

"PITTSBURGH, June, 1889.

"To the Dental Profession and Manufacturers and Dealers in Dental Goods:

"A terrible calamity has swept a once populous and prosperous city almost out of existence. Johnstown, Cambria County, Pa., which, with its suburbs, contained about twenty-five thousand inhabitants, is in ruins, thousands of lives lost and millions of dollars' worth of property destroyed.

"In this ruin our professional brethren have had their share. Johnstown contained ten practising dentists: one lost his life, others lost parts of their families, most of them lost all their property, and all have lost their practice, at least for a long time to come.

"The members of the profession in this vicinity, while recognizing the fact that nearly all have already contributed to the general relief fund, yet think that, as a simple act of justice, the profession at large should step in to the relief of our professional brethren in distress,—not as an act of charity, as that word is generally used, but in a higher sense, as brother to brother.

"The undersigned have been appointed a committee to present the matter to the profession and dental trade, and to receive subscriptions for the purpose named.

"We think the cause needs no urging on our part, believing that each and every one will be glad of the opportunity to cast in his mite.

"We need hardly add that our action is taken without the knowledge of the sufferers at Johnstown.

"Subscriptions may be sent to our Treasurer, and drafts, orders, etc., made payable to his order.

"Very truly yours,

"W. F. FUNDENBURG,

"J. G. TEMPLETON,

"H. W. ARTHUR,

"J. S. Goshorn,

"LEE S. SMITH, Treasurer,

"62 Sixth Street, Pittsburgh, Pa."

AN EXPLANATION.

Following the organization of the American Dental Trade Association, seven years ago, there was for a time an apprehension among dentists that its effect, if not its object, would be to increase the prices of dental goods and in various ways to oppress the dental profession. This misconception of its purpose was of course diligently encouraged by those who preferred not to join the Association. As time passed, however, the great majority of the profession came to recognize that the practical working of the Association, so far from being in any way oppressive to them, was really an advantage. A very few have chosen to maintain the attitude of martyrs,

and are still endeavoring to prejudice the minds of dentists regarding the Association, its objects and its results.

Within the last year or two there has been more than usual effort to disseminate views in opposition to the Association. Not only in dental society meetings and in dental journals, but in newspapers, there have been statements so at variance with the facts as to have all the effect of deliberate misrepresentation. The terms "dental trust," "pool," "combination," etc., have been employed with the view of arousing antipathy and antagonism through the impression sought to be created that the Association was open to the criticisms merited and bestowed on other organizations whose objects were conceded to be dishonorable if not unlawful. The Association has been referred to as "a combination to prevent competition, to perpetuate monopoly, and to squeeze the dentists."

In a published report of a union dental meeting, held in Boston in July, 1888, the following preambles and resolutions are reported

as having been adopted:

"Whereas, Certain manufacturers and dealers in dental instruments and materials have formed a combination known to the profession as the Dental Trade Association; and

"Whereas, The forming of such combination can only be an obstacle, retarding progress in the direction of scientific investigation, improvement, and higher professional attainment; therefore

"Resolved, That we consider the forming of such combination to be a reflection on the scientific and professional character of our profession.

"Resolved, That we invite all members of said combination to withdraw from the same, and we pledge them our hearty interest and support."

It is not easy to understand how the formation or the continuance of an association of merchants and manufacturers can retard "scientific investigation," interfere with "higher professional attainments," or "be a reflection on the scientific and professional character" of a profession. The resolutions were evidently prepared by one whose zeal was not tempered by knowledge, in an attempt to attack those who had no opportunity of defence or reply, and were adopted without consideration by those who fancied they had a grievance, without the ability to state its precise character. Most of the attacks that have been made upon the Association have been similarly vague and meaningless, and similarly calculated to impress the unprejudiced that any lack of a true "scientific and professional character" in their authors had

other explanation than the existence of a trade association, and must have antedated its organization.

The Association, at this its first annual meeting since the publication of the quoted resolutions and other like attacks, deems it fitting to present in reply a brief account of its organization and objects.

The American Dental Trade Association was organized between seven and eight years ago. Its germ originated during a dental convention, at a meeting, without preconcert, of five dealers, who were at that time in the habit of canvassing to some extent the same territory. The business in that section had been for some years in a most unsatisfactory condition. The original idea was limited to the suggestion of a local organization or board of trade, for the purpose of arriving at a better understanding among themselves. The subject, however, broadened, and it was finally decided to invite all dental dealers and manufacturers to unite in a trade association. After considerable discussion a plan of organization was matured, and, at a meeting held at Niagara Falls in June, 1882, the Association was formed. It now numbers about seventy-five members, including most of the leading manufacturers and dealers in the trade.

Previous to this there had been very little harmony or kindly feeling among those engaged in the business. Although in active competition, most of them were strangers to each other; there were jealousies and suspicions which led to doubtful dealing. There was a time when there were no dental societies; when each man was working solely for himself, perhaps with jealousy of his brother practitioner, and unwilling to aid him professionally. All dentists now know the value of association, of a code of ethics, and of occasional meetings for discussions and friendly intercourse.

In almost every branch of business there are associations and boards of trade for the establishment of commercial ethics applicable to their specialty, and for the cultivation of kindly feeling. The general sentiment of the community is that such associations are desirable, and that their effect is beneficial. It remains for a few dentists to deny to those with whom they have their principal dealings that which they highly value for themselves, and which is freely accorded by the whole community to other branches of mercantile business.

The objects of the Dental Trade Association are set forth in the second article as follows:

"The objects of this Association are to reform abuses; to secure

unity of action; to promote a friendly intercourse between its members; to avoid and adjust, as far as practicable, differences and misunderstandings between them, and, generally, to advance the interests of the trade in dental goods in the United States."

Allusion has been made above to the inharmony which existed, and to some of the abuses which obtained between the members before their association together, and which it was desirable to remove. The chief abuse which had grown up in the dealings of the members with the dental profession was discrimination of the rankest kind. It required the authority of the United States government to put a stop to unjust discriminations of the transportation companies of the country, and the Interstate Law has been everywhere approved as a long step in the right direction. The American Dental Trade Association undertook, of its own motion, to put a stop to discriminations in their own line of business, and to place all who dealt with its members upon the same plane of honorable and equitable treatment. Before that time there were, as there are now, regular list prices for goods, and the theory was that there were no discounts allowed from these prices, except in the case of a few articles which were charged at a lower rate when certain quantities were bought at one time. In practice this theory of no discounts was enforced at least nine times out of ten. The exceptions were when two or more eager salesmen were bidding against each other for the sale of a chair, an outfit, or large lot of goods, when oftentimes prices were accepted that left the dealer little or no profit. One case is on record where three dealers were bidding against each other for the sale of a chair, and the unfortunate one, who finally made the sale, sold the chair at precisely what he paid for it, and lost the freight from the factory to his store in the West. The correct theory of honorable mercantile dealing is that both parties shall be benefited by it, and although every one likes to buy as cheaply as possible, it is not believed that any fairminded dentist would feel comfortable in the belief that circumstances were compelling his dealer to serve him without profit, any more than he would feel satisfied to accept a fee from a patient without having rendered him beneficial service.

The unjust discrimination is apparent from the fact that the very next customer for a chair who presented himself would have been charged full list price, without any discount whatever, if he went to the dealer confidingly, and other dealers could be kept from knowing his want. It was the large majority of confiding buyers, who simply sent in their orders without question, who were

discriminated against, while comparatively few were favored with discounts. The Association corrected this by establishing list prices for time sales, and allowing what had never been generally done before,—a discount for prompt cash of five per cent. on bills of fifty dollars and over, and ten per cent. on bills of one hundred and fifty dollars on all goods except precious metals and such as were sold at a rebate for quantity,—as teeth in lots. These discounts are now allowed to every one that pays cash. The result is that the dentists, as a body, pay less for their supplies, on the same list prices, than they did under the former system of discrimination in favor of a few, and the business is placed on an honorable, dignified basis.

Neither at the formation of the Association nor at any time since has there been the price of a single article advanced because of its operations. On the contrary, a comparison of the rates of to-day with those prevailing eight years ago will show many, and in some instances large, reductions. Further, these reductions have almost all been brought about by competition inside the Association. All the talk about "combination," "dental trust," "pool," etc., as affecting prices, is absolutely baseless. There is but one rule of the Association that bears at all upon prices. Manufacturers, who are in almost every instance retailers as well, fix the retail prices of their own goods, as they always did, but the members who handle those goods agree to abide by the manufacturers' prices, which formerly they did not always do. In other words, the manufacturers permit the dealers all over the country to make a profit on the sale of their productions, at their prices, on the simple agreement that they shall not be undersold on their own goods. But the manufacturer can change his prices whenever he chooses, without let or hinderance, the only stipulation being that he will notify those who are dealing in his goods, that they may conform to the changes. Furthermore, in the case of two or more manufacturers making the same grade of goods, each is free to make his own rates, without any reference to the others. Thus the White Company and Mr. Justi have at present the same list of prices for teeth, but each house can change its rates at will, without consultation with the other or with any one in the Association.

Competition is also unrestricted. There is in no sense any pooling of interests, any limitation of production. Each member of the Association pushes his business "for all there is in it," just as though no Association was ever thought of. It could not be held together for a week on any other basis. It has been held together all these years on this foundation,—by a better acquaint-

ance with each other than formerly, by mutual respect and friendly intercourse, by honorable dealings with each other, and by absolute non-discrimination.

Can any fair-minded man, after the above candid statement of facts, find any ground for condemning the Association? Must it not be admitted that it has placed the business on a better foundation and on a more honorable plane than it ever before occupied? That it has operated and will continue to operate to the benefit of the dental profession is our profound conviction.

It must be conceded that it was a benefit to the profession to do away with discriminations; and the Association has been of positive advantage to the very large number of dentists that are remote from the manufacturers and larger dealers, by encouraging their local dealers, and enabling them to carry a larger stock to meet current every-day wants.

It would be a step backward to return to the condition of the trade that existed in certain sections of the country eight or ten vears ago. If the Association should be broken up, it would not eventually benefit the profession, and it would not be the larger dealers and manufacturers who would chiefly suffer by it. Instead of being close monopolists, as has so often been charged, the larger manufacturers have to a certain extent allowed their hands to be tied by the Association, for the benefit of the general trade, and particularly of the smaller local dealers all over the country. Who does not realize that in any general scramble for business, regardless of whoever stood in the way, the greater capital and facilities of the large houses would speedily overcome the smaller ones, and thus give to the former, in the end, a much greater opportunity of "monopolizing" than is possible under the present system? With this statement of its objects and methods the American Dental Trade Association confidently appeals to the good sense of the dentists of the country for an unprejudiced acceptance of its wellmeant efforts to help and not hinder the advancement of dental science and art, while seeking to establish and maintain a code of business ethics, as essential in its field as is the professional code to professional men.

The American Dental Trade Association.

LEE I. SMITH,

T. R. Morrison,

Secretary.

President.

New York, June 20, 1889.

THE

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INTENTIONAL DEVITALIZATION OF THE DENTAL PULP.²

BY WILLIAM H. TRUEMAN, D.D.S., PHILADELPHIA, PA.

WHETHER it is ever right, or under what conditions we are justified, in devitalizing a dental pulp, we do not propose at this time to consider. In preparing this paper my purpose has been to call attention to some matters not usually referred to by writers upon this subject,—matters that in my judgment have much to do with the final result of the operation. I shall therefore omit, as far as may be, all generally accepted theories, presuming that you are all perfectly familiar with them.

The difference between the condition of a tooth and its surroundings where devitalization has been the result of progressive pathological changes, and a tooth where devitalization is the desired result of therapeutic treatment, is so great that I have considered it worthy of separate and distinct consideration. In the first instance, our most earnest efforts are directed to combat pathological conditions, either active or passive, already existing; in the

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¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read at the nineteenth annual session of the New Jersey State Dental Society, Asbury Park, July 17-19, 1889.

latter, while we may not in all cases safely say that no pathological lesions are present, our efforts are mainly to prevent irritation, and to place the tooth in a condition as nearly normal as the mutilation it has suffered will permit.

Dr. H. C. Register, of Philadelphia, in a recently-reported discussion upon root-filling, has concisely and clearly defined the three conditions usually met with in treating pulpless teeth.¹

I have been impressed with the simplicity and clearness of the classification there given, which is very briefly as follows:

First, devitalized teeth, in which the pulp has been destroyed by intent; second, devitalized teeth, in which the pulp has died without being exposed to atmospheric influences, and has become putrescent; third, devitalized teeth, in which the pulp has been from the onset open to atmospheric influence, and is not only putrescent, but complicated with various septic conditions.

We might readily, as the text-books usually do, complicate this classification. I question, however, if it could be practically improved. It is a natural one. It indicates progressive pathological conditions, and suggests the needed treatment. A little thought will show the wisdom of some such classification, the separate and distinct treatment each class should receive, and with equal force that the confusion and apparent contradictions so noticeable in many discussions upon the treatment of devitalized teeth have arisen mainly from failure to appreciate these distinctively differing conditions.

I propose to confine my remarks to that class to which Dr. Register first refers,—viz., teeth that have been intentionally devitalized, the pulps being removed and the pulp-canals filled before any degenerative action has resulted from their devitalization; my purpose being to call attention to lesions that often exist, and which are the frequent cause of ultimate failure, notwithstanding the complete removal of the devitalized tissue and the thorough filling of the space it occupied.

We will now proceed to consider—only so far, however, as to trace the influence they may have upon the final result of the operation—some of these primary lesions, presuming that they have been sufficiently serious to justify devitalization of the pulp.

It is seldom that we are called upon to devitalize a tooth that is quite normal. Except preparatory to constructing a piece of bridge-work, I can think of no other instance in which it is likely

¹ INTERNATIONAL DENTAL JOURNAL, May, 1888, vol. ix. p. 290.

to be done. There is usually, if not always, some previous lesion, such as inflammation, slight or extensive exposure of the pulp, extensive caries without pulp exposure; devitalization being deemed expedient to secure reliable anchorage for the filling, or preparatory to inserting a crown, etc. In all such cases there has been more or less active pulp irritation, that may or may not prove detrimental to the future usefulness and comfort of the tooth.

Devitalization may be necessary to relieve pain caused by ossification of the pulp, encroachment upon the pulp by secondary dentine, etc. These conditions, except that they may render more difficult the complete removal of the devitalized tissue, are not usually serious complications. The formation within the substance of the pulp of nodulary dentine-a condition that, when requiring treatment at all, imperatively calls for devitalization—is a much more serious matter. These cases, when demanding treatment, are at times most obscure and unsatisfactory, especially when they exist in teeth otherwise normal. There is usually long-continued neuralgic pain extremely difficult to locate, the tooth in fault rarely giving any sign until the irritation has progressed so far that removal of the cause in many cases fails to effect a satisfactory cure. The tooth may be rendered, by devitalization and proper after-treatment, passably comfortable for a time, and its usefulness measurably restored, but there is apt to remain a soreness upon pressure and a general indefinite feeling of discomfort that eventually leads to its extraction. Nodulary dentine does not always prove so serious; indeed, it is seldom that we are called upon to treat it as a distinct lesion. It is found quite frequently in treating pulp exposure, where it does not seem to have been of itself at all serious, the previous pain and discomfort being no greater than might reasonably have been expected from the carious condition of the tooth. In such cases, except so far as its presence interferes with the action of the destructive agent and the removal of the devitalized tissue, it has seemed to have been a matter of no moment. Why it should in some cases prove to be so serious and in others not, I am unable to explain.

Considering the final result of treatment, I now pass to a more serious condition,—namely, cases where there has been active inflammation of the pulp. In these cases, no matter what may have been the causes of the inflammation, whether the near approach of caries, traumatic injury, or thermal changes, devitalization usually gives present relief; it does not, however, always arrest the pathological changes due to pulp irritation. They may indeed be for

the time arrested, but that does not insure the parts returning to a normal condition. In many cases the injury done is never fully repaired. We must remember the peculiar anatomical conditions here existing,—conditions found nowhere else in the human body. Within the soft tissues distending vessels meet with little resistance, the adjacent tissue permits increase of calibre and serous effusion with impunity; around the apex of the root, surrounded as it is by practically unyielding bony walls, this can take place only to a very limited extent without being accompanied by serious injury that will remain long after the cause producing it has ceased to exist.

It is a well-recognized sequence of inflammation that a part once so affected is peculiarly liable, upon slight and otherwise insufficient cause, to a return of that peculiar pathological condition and those other conditions which arise or proceed from it. It would seem as though the circulatory vessels affected, although relieved of the undue tension the disturbed circulation has produced, do not at once recover their normal tone. We may roughly express the idea by saying that the elastic or muscular coating has been stretched or strained beyond its normal elasticity, and but slowly, if ever, returns to a normal condition. The greater the degree of inflammation, or the longer time it has continued, the more slowly and the more uncertain is this return to normalcy.

Again, we may have within the tooth-pulp, without its having seriously disturbed the comfort or even having at any time attracted the patient's attention,-the result of caries, thermal changes, violence, or other causes,—a slowly progressive irritation that may painlessly originate, and may so continue for a long time; it may proceed so far that devitalization of the pulp takes place, and other progressive pathological changes follow one after another, until there is established a chronic alveolar abscess with well-defined fistulous opening, through which pus is being more or less freely discharged. These cases are by no means rare. It may happen that at any stage of such a case, perhaps before devitalization of the pulp has taken place, and after any operation other than intentional devitalization could be successfully performed, a sudden increase of irritation compels the patient to seek advice and relief. Can we at all times with certainty, in any such case, accurately diagnose the exact condition there existing,-how long the irritation has continued, or how far the injury has extended,-or accurately gauge the recuperative powers of nature so as to fix in our own minds how nearly the parts will, under judicious treatment,

return to and resume a normal condition and a normal relation to the general system?

The history of such a case is practically unknown to us, and equally uncertain must be the final result of any operation we may attempt towards the preservation of the tooth. I might, but do not think it necessary to do so, refer to many other conditions of greater or less serious character that precede and handicap at the very beginning the success of this operation, and which introduce, in spite of all the care and skill we may bring to bear upon it, an element of uncertainty. In a vast majority of cases,—we may perhaps say in all,-where intentional devitalization of the dental pulp is necessary before filling a carious cavity, this irritated condition of the pulp is present to a greater or lesser degree. Where this is confined to the pulp, we may perhaps say, when it is, it is a matter of but little moment. I have no doubt that this is sometimes the case, and equally have no doubt that in many cases -cases where it is not suspected, and where there is no indication of it—there is present in the tissues beyond the apical foramen the result, or it may be the cause, of the pulp lesion,-a degree of irritation. I have no question that, independent-in a measure at least-of the treatment we may adopt, upon the presence or the absence of this primary irritation the success or failure of the operation largely depends.

Now, before proceeding further, let us try to fix in our own minds what we mean by "success," in treating teeth intentionally devitalized. What do we hope for; what do we strive for; and where draw the line between success and failure?

The ideal successful case is one in which, first, there has existed no lesions other than those which may be entirely relieved by devitalization and removal of the pulp; and, second, where, these operations having been accomplished without accident, the pulp removed, and the space occupied properly filled, nature has accepted the situation, the nutrient currents of the pulp have been so diverted that there is no undue strain upon the vessels concerned, and every portion of the tissue surrounding the apex of the tooth receives a sufficient supply. Where this is the case, the relation of the tooth to the general system has been but little disturbed; it may not now, perhaps, have the power to resist the encroachment of destructive agents to so great a degree as when the pulp was intact; we cannot consider it as valuable and as trustworthy as a vital tooth. It is more liable to fracture, if from no other cause than the necessary removal of a large portion of its substance in the effort to reach

and properly fill the pulp-chamber and its appendages. There seems, however, developed in the course of a few years—in many cases, not in all—a change in the character of the dentine and also of the enamel. It becomes more brittle, and, where exposed to mastication, the edges of cavities and projecting portions of the tooth are apt to shatter and break. There seems also, after the lapse of considerable time, in many cases, a tendency to recurring decay more marked than in vital teeth of the same character. A devitalized tooth may, however, and frequently does for many years in spite of this, continue to perform its proper functions with comfort and satisfaction, and practically its usefulness may be but little impaired.

Of the many teeth intentionally devitalized the percentage of cases that are thus really successful must ever remain unknown. To determine this a well-kept case-book affords but little data. Thousands of devitalized teeth are to-day doing excellent and comfortable service, and may continue to do so for years, in which every element upon which success in treating such teeth is supposed to be based has been violated. Pulps have died under fillings,-in many cases the sequence of pulp-capping,-in some cases the tooth has darkened from infiltration of decomposed pulp-tissue, and yet, if the patient's testimony be accepted, there has been at no time the slightest discomfort; the change in the color of the tooth being the only observable indication of the change in its condition. These teeth are, of course, a constant menace. Nature simply tolerates them; they prove nothing beyond the fact that at times nature will tolerate a great deal with but little complaint. A slight change in the system or in the surrounding parts, a change in the patient's health or the local effects of a cold, may at any time set in motion pathological changes that will quickly result in an alveolar abscess; this exciting cause being absent, for a long series of years this may be held in abeyance, and the tooth remain as comfortable and as useful as its better-conditioned neighbors.

Precisely the same condition may follow the intentional devitalization of a dental pulp. An undiscovered lesion, an overlooked accident in the operation of devitalization and subsequent filling, or causes beyond the operator's knowledge or skill, may, in spite of all that he can possibly do, place the tooth in a condition quite as menacing as in the case above referred to; and yet it may be tolerated and remain comfortable for a variable time,—it may be months, it may be years,—ready, however, to give trouble at any moment. With this element of uncertainty constantly present,

with the additional uncertainty of being unable in most cases to determine with any accuracy whether untoward results are due to an imperfect operation, defective methods, or a pre-existing condition which no skill can detect or overcome, any attempt to formulate the results of this operation must ever be received with caution and distrust.

After careful study, extended over many years, I feel a constantly increasing inability to fix upon any standard by which to judge the results of pulp treatment other than this: the patient comes to us in distress, we hope by our treatment to afford relief, and strive to preserve the comfortable usefulness of the tooth. If we succeed in doing this, we may count the operation a success; only so long, however, as this comfortable usefulness continues. We must ever, in making up the record, remember that the result, favorable or unfavorable, may be as largely due to matters over which we have no control as to our own judgment and skill. The lapse of time, of itself, is no assurance of success. An intentionally devitalized tooth, imperfectly treated, is quite as likely to remain comfortable for a long time as is a tooth in which the pulp has died and has received no treatment. An intentionally devitalized tooth, which has received the best, most careful, and thorough treatment, may quickly give trouble from causes over which the operator has no control, and for which he is in nowise responsible.

I do not wish to be understood as intimating that treatment has but little to do with the result. In some cases it has not; in a large majority, however, judicious and thorough treatment will be followed by correspondingly good results.

I wish to state most emphatically my conviction that, under the most favorable conditions, a devitalized tooth is never as reliable and trustworthy as is a normally vital one. Accident or pathological conditions frequently make the surgeon's knife a necessity; not infrequently the surgeon is called upon to decide whether to sacrifice a limb or risk the patient's life. No matter how skilfully the operation is performed, or how quickly or thoroughly the patient recovers, or how perfectly the lost member is supplemented by dexterous use of those that remain, the patient is none the less a mutilated being, and to that extent his life and well-being is more frequently in jeopardy. A devitalized tooth is a mutilated tooth. The pulp may have, as some contend, ceased to be useful; I do not so think: so have some other organs of the body; notwithstanding that, however, their surgical removal would be attended by most serious results. So is—to the tooth at least, in many cases—the

removal of the tooth-pulp from precisely the same cause: not so much the loss of the organ as the injury necessarily done to adjacent parts in effecting its removal.

Various attempts have been made to so modify the operation of devitalizing a dental pulp as to lessen the risk of after trouble. Arsenic, the agent usually employed, has been charged—unjustly, I think—with causing many of these evils. In careless hands, we all know it is capable of doing a great deal of mischief; but we are not considering that now. We are presuming that the operation from beginning to end is carefully and skilfully performed. It has been asserted that the arsenic may escape through the apical foramina, or in the same way that it acts upon the pulp, without really passing through this opening; it may, and in many cases does, produce its peculiar effect upon the tissues at the apex of the root, and thus lay the foundation for future trouble. To avoid this. extremely small quantities have been recommended, or it is left in contact with the tissue but a short time. How arsenic effects the destruction of a dental pulp is, I think, an unsolved problem. We are taught that it is absorbed by living tissue only, and when applied as an escharotic for the removal of tumor, etc., its action is limited by using it freely, so that it quickly destroys the tissue with which it is in immediate contact; this dead tissue then acts as a barrier protecting the living tissue beyond. In these cases, were it applied less freely, it is quite probable that so much would be absorbed that serious systemic effects would follow. Many years ago, when it was recommended and used for treating sensitive dentine, it was soon found that no precaution prevented the complete devitalization of the pulp; it was utterly impossible to limit its action to the dentine alone. Even when the arsenic was finely pulverized, used dry, in its least active form, and for a few hours only sealed up in a superficial cavity, the tooth-tissue, immediately after its removal, being excavated so deeply that every portion with which the arsenic had been in contact was removed invariably; notwithstanding all these precautions, the complete devitalization of the pulp was a question of time only. This being the case, how absurd the idea that by pricking into the exposed portion of the pulp a minute quantity of arsenic a portion only of the pulp will be destroyed and the apical one-third or two-thirds remain vital! I cannot conceive this to be possible in any case. I know that on attempting to remove a devitalized pulp we may find the apical portion quite sensitive to the touch of the instrument; I know, also, that in teeth with more than one root the pulp may readily and without pain be removed from one while its removal from the others—usually the smaller roots—may be painful and difficult; but is this any evidence of vitality? We frequently find the same sensitiveness upon first opening into an intentionally devitalized pulp,—so sensitive are they, occasionally, that it is hard to realize that the arsenic has done its work; and yet, after thoroughly exposing the pulp, there has been no difficulty in effecting its complete removal painlessly, showing conclusively that it had been completely devitalized. What reason have we to suppose that the sensitiveness in one case indicates vitality, when we know that in the other, precisely similar, it does not?

To avoid the evils supposed to be associated with the use of arsenic other means of devitalization have been employed; I presume that they are all perfectly familiar to you. Believing, as I do, that they possess no advantage over the use of arsenic, I do not propose to consider them. To my mind it is not the means employed: it is not so much—although much may depend upon it—the after-treatment the tooth may receive, the local changes made necessary by the devitalization of the pulp; the local changes that may have preceded and those that necessarily follow the operation are the real enemies with which we have to contend.

Recall, if you please, the general anatomy of the dental pulp. When this is devitalized and no longer able to utilize the nutrient currents that have been flowing to and from it, what takes place? First, with the nutrient vessels there is a stagnation of their contents; at some point these vessels become permanently closed; then the nutrient currents, no longer able to follow the accustomed channels, seek other openings; an anastomosis, as it is termed, takes place. Smaller vessels are enlarged, and in a short time the current that once flowed into the pulp now flows by it. It is now very possible that, as a result of this change, portions of the tissues around the apex of the root, formerly supplied by vessels branching from the occluded portions of the arteries and veins leading to and from the pulp, may be deprived in a measure of their nutrient supply, and thus predisposed to break down from slight systemic or local causes. May not this explain the origin of alveolar abscess that has no connection with, and cannot be reached through, the apex of the root, and of abscess that occurs for the first time many years after devitalization and treatment of the pulp?

I appreciate fully how important and useful have been the results of the close study of the cause of traumatic irritation during the last few years. It has enabled us to work with more confi-

dence, and to obtain better results in many cases. It has not, however, given us much assistance in treating intentional devitalization. In uncomplicated cases, where the pulp can be thoroughly removed and the space it occupied as thoroughly filled, there is little need for antiseptics. In other cases, where, on account of the position of the cavity, condition of the pulp-canals, or restlessness of the patient, thorough removal becomes impossible, we are compelled to trust more to the kindliness of nature than to the resources of art. I question seriously the real practical value of antiseptics in such cases. If the tissues we desire to render inert were perfectly dry, or in a condition to readily absorb and become thoroughly impregnated with the antiseptic agent, it would undoubtedly accomplish its object; but such is not the case, nor can they be so made. The application of heat, by means of dry, heated atmospheric air or a heated instrument, is so limited by the sensitiveness of the parts that the effect must be superficial and of questionable usefulness.

The named methods of treatment have been so thoroughly written upon and discussed that I can say but little upon this subject that you do not already know. From the fact that advocates of widely-differing methods claim each for his own a very satisfactory measure of success, I have come to regard it largely a matter of individual preference. The same may be said of the material used for root filling. Provided the tooth remains as we leave it, there is little to choose among the many available methods recommended for this purpose. In case decay should recur and extend so as to again reach the pulp cavity, an indestructible material like gutta-percha, tin, lead, gold, etc., provided it makes a perfect filling, would then have a very decided advantage over others that readily disintegrate.

In conclusion, I advocate strongly the conservation of the dental pulp in all cases where it can be attempted with a fair chance of success. I recognize at the same time that in many cases the devitalization of the pulp, with all its attendant evils, is decidedly the best course to pursue. We will not always attain desired success. We must expect some failures from causes beyond control. We will have occasional irritation, occasional abscess, and occasional extraction.

SPRAY-SYRINGE FOR TREATMENT OF DISEASES OF THE ANTRUM.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK CITY.

Serial lectures, delivered by me early in the winter of 1878, before the students of the Pennsylvania College of Dental Surgery, on the "Radical and Heroic Treatment of Alveolar Abscess" and antral diseases, were, during the following year, published in the Missouri Dental Journal, and several of my instruments were shown. Since then, in the Independent Practitioner, and, still later, in the Dental Cosmos, my improvements upon the syringe used for treatment of the antrum (and loculosis alveolaris) have been illustrated and explained.

The object of the present article is to describe another syringe, which belonged to the original set.

In explaining the possible, yet infrequent, cure of an antral disease without extraction of an offending tooth, I referred to the normal condition of the antrum with its outlet upon the nasal cavity, situated a little above its floor, and said that "if the membranous coverings of the walls of these cavities are swollen, this natural outlet may be wholly or partly closed." Two such cases, at that time under my care, were cited, and I showed how, in each, the only means of discharge (especially if thick) was by using an aspirator which was therein described.

Figure 3 illustrates the syringe, which is made of metal, nickel-plated, and has a glass barrel. The oval end of the nozzle is closed like the end of an egg, but has several small jet-holes in its sides, about one-eighth of an inch from the apex. This closed end not only enables the nozzle to enter the antral chamber without irritation or pain, but it is also not liable to become clogged by being forced into contact with the tissues or walls of the antral eavity, which, when an ordinary tube is used, is generally the case.

Injury, likely to result from such violent pressure of the nozzle against the antral chamber or its thin roof (which is actually the floor of the orbit), is provided against by an adjustable bolt-gauge or collar, soldered to a sleeve, which slides backward and forward on the nozzle's body, and can be firmly set at any desired point, on

the principle of the "universal clamp," as shown, in section, in Fig. 1, so that when the ball rests against the outward portal of

Fig. 1.



the drain-canal, the jets and spray can be made to fly in all directions from the central portion of the antral space, and with such force as to thoroughly drench and cleanse every part, as Fig. 2 exhibits.

These instruments were the first ever used, so far as I know, for spraying the antrum.

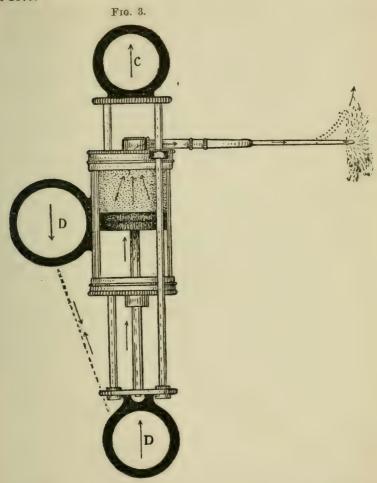
For home use of intelligent patients, who are capable of per-



forming this operation, I sometimes lend them the syringe above referred to, which is specially adapted for self-manipulation. It acts both as a syringe and an aspirator (Fig. 3.). Resting in the palm of the hand, by means of thumb and finger the piston can be made to play both ways. Notwithstanding its complicated appearance, the operation is really very simple. It should be borne in mind that a syringe, when used as an aspirator, should not be operated a second time without being cleaned, and never used upon

another patient until it has been disinfected and the packing renewed.

The spray-nozzles that I now use for antral treatment are precisely the same as those that I used upon the syringes shown in 1879.



When the antrum is not accessible through the socket of a tooth, this spray-nozzle is replaced by a longer and slimmer tube to enter the antrum by way of the nares. These nasal tubes, of which there are two (right and left), are fitted directly upon the syringe-stub or interposed by a piece of elastic rubber tubing.

THOROUGHNESS.1

BY WM. H. ATKINSON. M.D., NEW YORK CITY.

Thoroughness may be taken to be the backbone of purpose when persisted in to the end of its career. But it must not be so rigidly interpreted as to preclude alacrity and flexibility in acquiring a knowledge of the exactitude of the plan of the work to enable us to discriminate the limitations and conjunctions of the parts, so as to have them harmoniously combined into a smoothlyworking system, with the least possible loss of energy and the greatest increment of power. Thoroughness in preparation leads to fulness of endowment in diagnosis, prognosis, and treatment of disease. The object of thoroughness is to have work well done.

Work, to be well done, must conform to the necessities of plan as basis of purpose of the performance, of whatever sort it be. Thoroughness of preparatory knowledge makes thoroughness of effort possible, and thoroughness of effort makes possible a result thorough in its conception, preparation, and execution. Enough is contained in any modern college curriculum to eminently fit the graduate for active useful life, were it thoroughly taught and thoroughly learned. Too much effort is partly wasted in the attempt to teach large numbers. Too much stress is placed upon the personality of the instructor, and too little thoroughness is demanded of the student in taking each step as he mounts, and the widespread attention a large class demands precludes that individual constant notice which is vital to a comprehensive grasp by the student of the inception, progress, contemporaneous condition, and modus operandi of any department of human effort.

Genius needs must fly, and every advance owes genius much, if only because it points the way for the thorough worker to seek growth.

To be thorough in effort one must have been thorough in preparation. A clear conception of the conditions presenting necessarily precedes a proper or thorough ability to deal with such conditions. Thorough grasp of the work of others, whether such work was thorough or not, aids greatly in laying out effort. Thoroughness is a quality mostly of inheritance, but may also be

¹ Read at the semi-annual meeting of the Massachusetts Dental Society, Boston, June 6, 1889.

cultivated in those naturally negligent and loose in their modes of investigation and execution. The mass of pupils under instructors (private and in colleges) are more desirous of meeting the views of their teachers so as to pass with high marks and get their degrees than to thoroughly comprehend the teaching satisfactorily to their own understanding, which would be more effective in gaining them those high marks than any abject copying of formulæ and special interpretation, supposed to be in favor with their instructors. This simply means that the desire to pass the examinations and be recognized as in possession of knowledge is a much stronger instinct than to possess the knowledge and have recognition deferred to a later date.

The thoroughly honest mind is a sort of duplication or other self, the standards of which must be met to call forth full assent and coincidence with the soundness of the propositions brought before it for decision. This is equivalent to saying "the dentist must be born, not made."

Thoroughness is the prerequisite of rapid and permanent growth in every department of human life, and as a comprehension of the rise of dentistry—what it has been, what it is, and what we hope to make it—involves knowledge of science, art, and execution, we must possess all these and hold them in a tentative readiness to be applied whenever the occasion arises in which their application will thoroughly complete the work in hand.

As it is not the prerogative of any individual to be thus endowed, it is a great satisfaction to us to know that there is this ability somewhere among us, the correlation, aggregation, and application of which will make us adequate to the new demand, as former steps or stages of progress in our calling have so eminently proved to the benefit of mankind, by better interpretation and more thorough comprehension of the principles involved than former times have shown to be possible to men devoted even to special departments that should have fitted them for apprehension, comprehension, and practicalization of the advances of scientific attainment on a sure ratiocinative basis.

The origin of what we at present have as textual doctrine is the mass of accumulated experiment reduced to principles and set formulæ, which grew from the inspirations necessity brought to individuals.

Science scorns empiricism, and yet owes to it many facts that the inspiration of empirics led it to investigate. Old women's remedies have cured many diseases, and modern medicine is much in the dark as to the facts of the operation of drugs on the human system.

Because a certain drug has been said to be of service in a certain complication, that drug has come to be accepted as the one to be exhibited.

Any well-laid plan of procedure, thoroughly carried out by earnest and fraternal co-workers, must succeed in the ratio of the persistence with which it is pursued.

Clinical instruction was inaugurated under the sense of the need among our fraternity for its practical demonstrations. To it more than to any other single means do we owe our unprecedented advancement. Although our clinics as now held are immeasurably better than none, still much might be done to increase the benefits of such efforts.

I believe each section of a certain population should unite their local societies into a general body, and locate a permanent home in a central town where quarterly or semi-annual or more frequent meetings could be held. Such home to have connected with it a spacious laboratory and operating-rooms, the latter of which could be utilized for meetings, and the operating apparatus stored for the time being in the laboratory. These rooms to be fitted with sufficient engines, chairs, stools, stands, impression-cups, forceps, and electrical connections or batteries, furnaces, vulcanizers, lathes, vices, anvils, and rolling-mill, and to be supplied with gas, plaster, and sand,—in short, such fitting up as a properly-equipped college laboratory and operating-room would demand to the extent of the purpose in view.

This home should be accessible to members of the societies uniting in its support, and upon application to the clinic committee, or committee in charge, and to such other members of the profession as desire to give clinics before the section meeting, or any meeting held in the home. This privilege to extend over such time as might be necessary in previous preparation for the clinic, or in the case of members for experiment, or, perhaps, for regular work under control of the committee in charge, on payment of specific fees arranged by the section.

The supply of the requisite heavier tools and instruments would materially reduce the apparatus a useful demonstration requires an operator to bring, sometimes, from a great distance and at considerable expense, and too often at no pecuniary recompense to himself.

It would increase the chances for superior clinics, and elevate the tone of these demonstrations as well as increase their worth and scope. A nice operator deserves nice surroundings, and expert work demands complete equipment of tools and instruments.

Were these reduced to such as the operator could easily carry with him, at no additional expense, many of the grave objections to public clinics would be avoided, and the quality of the work offered to clinic committees would be much advanced.

Added to this home scheme might be the establishment of a limited number of apartments for the entertainment of guests of the society; in fact, the whole scheme covers in many of its features the plant of a post-graduate school as well as a social club, and could be made to serve a very useful purpose in elevating our profession.

These sections might be combined in a union which would publish its own transactions, and could include a publication bureau for the general profession, through which notices of meetings and general professional printing and publishing could be carried on.

Many of the supplies would be willingly donated by members, and the initial expense of such a home need not be very great.

As all things must have a beginning, the effort at first might be small and cover little ground, and grow with the development of its own worth.

In some sections it might prove more feasible to offer meeting-rooms to other societies, which would tend to lower conducting expenses,—as is done by the Academy of Medicine in New York. A bureau of information would naturally result from such a home; assistants and operators could find mutual help through it; improvements in methods and apparatus could be encouraged by it, and the opportunities for exercise of beneficent action would constantly arise. The scope of such a home can hardly be named.

The clinical conference of the Massachusetts Dental Society offers a feature of value to all such meetings.

The First District Society of New York has, for a year or more past, printed an invitation to present cases for advice at its monthly clinics, which regularly appears in its notices, but the scope of the conference referred to more nearly meets my views.

I have thought to propose that society members, or others, would notify their local clinic committee of their willingness to give one or more clinics, naming the case or cases and the times when they would hold them, and that engagements could then be made, either by the committee or through it by the operator, by which not more than five dentists would be invited to witness the clinic; and as there would be several separate opportunities thus

offered, preferably on regular days, as societies now hold their clinics, many would really see the clinic, and therefore benefit by the whole operation; whereas, now, one or two may see most of a clinic, but the fact of the operator working away from his accustomed surroundings hampers him, as also does the crowding of the many eager to see all they can.

Any clinic committee will agree that to secure good operators on good subjects is anything but an easy task, and a thoroughly good clinic is of immense value in bringing home to the observing dentist the daily need for thoroughness.

I do not think clinical operators receive the consideration or the credit their efforts should call forth. How many of those who observe are willing to step in and operate?

Properly started, managed, and supported, the home would be a boon indeed. The establishment of a chemical laboratory in connection with it is a further elaboration of the scheme, as also a library, museum, directory, purchasing agency, receiving office for mail and merchandise. But the opportunity is broad. Can it be embraced? Perhaps at first in part. We will see.

NECROSIS OF THE PALATE AND SUPERIOR MAXIL-LARY BONES, THE RESULT OF ALVEOLAR ABSCESS AND A RUBBER PLATE.¹

BY WM. D. BABCOCK, M.D., LOS ANGELES, CALIFORNIA.

The patient was Miss X., a seamstress, aged twenty-seven, and of general good health. The only exception was her menstruation, which was irregular, six months sometimes elapsing between the periods. The family history was excellent.

At fourteen she first began to have trouble with her teeth, the pain usually being on the right upper side. All the teeth on this side were affected, and at times those on the left. The two lower molars on the right side had also given her trouble.

These attacks continued intermittingly until five years ago, when she began to have abscesses at the roots of the teeth. She frequently sought the aid of a dentist; but at last, in order to obtain

¹ Read before the third annual meeting of the Southern California Odontological Society.

relief, had all the upper teeth extracted. Before these were pulled nearly every one was discharging offensive pus. She now had a rubber plate fitted. In May, 1885, she noticed that her nasal catarrh, which had previously been slight, was rapidly growing worse. Her head, too, gave her considerable annoyance, feeling as if it were stopped up by a bad cold. After a season of apparent recovery, she had, in June, 1886, a return of the catarrhal symptoms, and has suffered from these more or less ever since.

In September, 1887, she first noticed an opening in the hard palate, at the junction of the superior maxilla and the palate bone, though she had never felt any particular tenderness in or sponginess of the hard palate.

I saw her first in November, 1887, when I removed the vomer; and since then I have also removed a portion of the palate processes of both palate and superior maxillary bones, along with a part of the alveolar process of the right maxilla, between the cuspid and bicuspid teeth.

She has now in the hard palate an oval opening three-fourths of an inch long and half an inch in width at the widest part. I had never before seen such rapid and wholesale destruction of bone, unless it was caused by syphilis; yet, though I have inquired most carefully into the case, telling her of my suspicions, I have been able to find no sign of syphilis. She willingly submitted to a course of antisyphilitic treatment, but without the slightest beneficial effect.

The woman, when she came to me, was almost distracted, fearing that she had this disease, since her family physician had said that such bone destruction could come from syphilis only. only exposure she ever could have had was from a young woman, a room-mate, who slept with her, and who had some trouble with her genitals, the nature of which my patient could not learn.

After finding that the treatment did no good, I began to look about for other possible causes.

I noticed that although she was wearing a well-made rubber plate, yet the gums were red, swollen, and tender throughout the extent covered by the plate, and I advised replacing it with a metal plate. Since wearing this she has made a rapid change for the better. The odor and the discharge ceased; the gums became hard and of a natural color, and the destruction of bone entirely stopped.

This case was to me an unique and instructive one. The trouble was first an alveolar abscess, and then destruction of the periosteum.

The process now following up the lymph canals, invaded the Schneiderian mucous membrane, on account of its intimate connection with the previously affected parts, and gave rise to the so-called catarrh. The bone destruction was aided, in my opinion, by the rubber plate; for as this is a non-conductor of heat, it would prevent—the mischief once started—the heat escaping from the point of abscess formation, and thus increase the trouble.

SOME PHASES OF DENTAL LITERATURE.1

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

THE practice of dentistry as a distinct department of medicosurgical art is of such comparatively modern origin that its literature is relatively recent; but its history in its entirety has yet to be written. A very creditable though hastily compiled account of the rise and progress of American dentistry, including a glance at its ancient origin, was embodied in a small volume by Dr. James E. Dexter, under the auspices of the American Academy of Dental Science, in 1876; but a complete condensed record of the development of dentistry from the beginning is still wanting, and is a great desideratum. There are in this country libraries containing in large measure the materials for such a work, and it would seem that the requisite professional ability, scholarship, and industry should not be lacking for the undertaking. Indeed, it is the chief object of this brief paper to arouse a renewed interest in the subject, and lend, it may be, some incitement to the accomplishment of the object which is so obviously a pressing need of the present day. This need becomes the more apparent when we consider the already established position of dentistry in the ranks of the recognized professions, in which technical literature forms so prominent a part.

The subdivision of professions into specialties, wherein attention is focussed upon the different branches or departments of the callings, with a correspondingly increased minuteness of observation and differentiation, leads, furthermore, to an expansion and elaboration of descriptive terms which render it well-nigh impracticable for any single professor to become familiar with the minutiæ of the whole field.

¹ Read before the New Jersey State Dental Society, Asbury Park, July 19, 1889.

For instance, the medical practitioner of fifty years ago was compelled to combine in himself the functions of the physician, surgeon, gynecologist, dentist, oculist, aurist, dermatologist, druggist, chemist, etc., as indeed must be of to-day be in sparsely-populated sections; but let such an one enter the library at Washington and look over the classified contributions to these branches in their direct relationships to the art of human healing, and he will stand in astonishment before the unfamiliar terms of the proficients who have independently and assiduously cultivated every part of the field represented by this mass of medical literature.

Dentistry is in nowise behind the other groups of the advancing medical membership in practical progress; yet there is reason to think it desirable that greater efforts should be made to attain a higher degree of cultivation in the art of permanently recording the degrees of progress that constitute the real value of the literature which is to become history for the professional men of the succeeding ages. It appears quite probable that the prevalent eagerness of everybody to get ahead of everybody else, with everything, is overmastering the old-time conservative injunction to make haste slowly, and there is therefore no time reserved for a record of the ways and means by which the advance may have been made. On the other hand, it would sometimes seem that the infectious methods of the newpaper reporters have been caught by professional pioneers who, by return mail or telegraph, put in print their supposed or wished-for discoveries, lest others should anticipate them and their own news be deemed stale. Alas! it too often turns out that the things realized or guessed at so hastily were already a part of the literature of the past, but had been lost to sight because of their burial in some ephemeral paper or journal, or even in a persistent journal, whose bound volumes have no classified general index by which the contents of the series might be topically reviewed by the thoughtfully studious practitioner. Moreover, such bound volumes are possessed by comparatively few, and even these, if we judge by the absence in current literature of anything like topical research, are both forgetful and neglectful of the stores of interesting and practical information at their command.

The possession or use of a library which embraces every obtainable book or journal relating to his specialty is one of the unmistakable signs of a studious professional man, and is also one of the indispensable accompaniments of a truly professional career. The fact that some modern dental books, of large size and high cost,

have an extensive sale is indicative of a growing taste for professional information directly applicable to daily practice.

For example, "The American System of Dentistry," in its three large volumes, is comprehensive yet specific in exposition of modern theories, discoveries, and modes of practice; but the intelligent practitioner desires knowledge of all the superseded or discarded means and processes of dental practice, in order that he may not waste time in repeating abandoned methods, and also in order that in emergencies he may avail himself of some old expedients that had been proven to be of special use, though not adapted for general employment. A library is therefore a necessity as well as a sign of a thoroughly-equipped professional specialist, such as the dentist ought to be. As a fact, he is not yet a book-buyer, a journal-reader, and a preserver. Comparatively few have even the standard text-books, and fewer yet have bound copies of established American journals, to say nothing of foreign books and periodicals published in the English and other languages.

Such discreditable dearth of dental literature among would-be professional men is by no means an encouraging feature of the prospects for the future of dentistry as a specialty in the art of healing. Nevertheless, it is entirely practicable to engage in concerted and persistent endeavors to develop and foster among dentists a due appreciation of the professional necessity of cultivating an intimate acquaintance with past and present dental literature. As one means to this end, the formation and maintenance of society libraries is worthy of immediate and systematic consideration. Another—the history already referred to—may be expedited by society action; indeed, the present is a good time and this Society a good medium for initiating action with this object in view.

The editor of the "American System of Dentistry" has therein shown competency for the desired work, and probably has such relations with well-known publishers of professional books that unusual facilities for forwarding the undertaking would be at his command.

So far as the writer knows nothing has been said or intimated on this subject to Dr. Litch; but the suggestion of his name is made with the design of inducing prompt and definite action in a matter of such obvious importance to the profession. Spasmodic efforts in this direction have been made in somewhat recent years, but practically nothing has been accomplished.

Indeed, nothing of this kind can be accomplished unless there shall be aroused a vivid perception of the fact that the honor of

the dental profession is jeopardized by further delay in putting into a generally accessible printed form the main facts in the development of cosmic dentistry from its beginning to the present time.

Some very valuable preliminary work has been done by Mr. George Crowley in his "Dental Bibliography" of 1885, which is a standard reference list of books on dentistry, published throughout the world, from 1536 to 1885. These are arranged chronologically, serially numbered, and supplemented with a complete cross-reference to authors. The work is thus very conveniently adapted for use by the historian as well as by the studious dentist who has a library.

The monthly bibliography of dental literature, compiled by J. Melvin Lamb, M.D., and published in the *Dental Cosmos*, is another aid to the historian that cannot fail to be duly appreciated by him.

The work should of course be printed in English as most nearly approximating a universal language, but if condensed into a few volumes, of not too large size, there will no doubt follow translations into transatlantic tongues, as notably the French and German.

With this mere epitome of what might readily be said on the subjects introduced, the matter, which may well be deemed one of great consequence to dentistry as a profession, is laid before this prominently progressive and assiduous Society in the confident expectation that proper, immediate, and effective action will be taken.

Reports of Society Meetings.

MASSACHUSETTS DENTAL SOCIETY—(Continued).

Thursday, June 6, 1889.—Morning Session.

PAPER, "THOROUGHNESS," BY WM. H. ATKINSON, M.D., D.D.S., NEW YORK CITY.

After the reading of his paper, Dr. Atkinson continued: "In place of being the mere demonstration of mechanics, dentistry stands to-day on the pinnacle of science, and exhibits an intelligence and development consonant with the activities of human beings. To be a good dentist you must know all that other people know. You must be a theologian, to begin with,—to be moral; you have to be lawyer, anatomist, and pathologist, and you must have your mental pigeon-holes full of reasoning powers, added to that fulness of human life that makes you think that you are called here for a purpose to bless mankind."

DISCUSSION.

Dr. W. X. Sudduth.—I was much pleased with the paper in that Dr. Atkinson proposes a plan that has been in my mind for several years past. We, in Philadelphia, have formulated a scheme that promises during the summer to take tangible form.

We propose to secure a place where clinical operations can be given in our city, which will also serve as a home where dentists can be taken and entertained in a scientific and literary way. We are, further, going to reorganize the Odontological Society of Pennsylvania on the same basis as laid down by Dr. Atkinson in his paper. Our idea is this: We expect to form within our Society a "Dental Club," the privileges of which will be secured by the payment of an additional fee. The membership fee of the Society will be the same as heretofore in order not to make the fees burdensome to young men; the older members will assume the expense of the "Dental Club" room, which will be a social meeting place, where laboratory and other scientific work can be carried on. It

will also include a library, where we expect to accumulate scientific reading matter. This will certainly prove of great benefit to the dentists of our city, as well as outside. After office hours they can go there and see the latest exchanges, talk over scientific matters, and all will tend to our social as well as professional advancement.

Dr. J. G. W. Werner.—I would certainly approve any method or scheme that had for its object the performing of clinics that would be of any value, for as I look upon them now they seem to be practically of no benefit. Who is there who has been able to see anything to advantage up-stairs? The great inconvenience of having no table for the operator; the desire of every one to see. Five men, possibly six, are all that can satisfactorily see a dental operation performed at the chair. It is impossible to enjoy a good clinic under such conditions. They are not practicable and of no particular benefit to any one as long as the operator is trying to accommodate a crowd of fifty people.

In order to establish our profession on a broader basis we must establish hospitals. In Europe this has been done. They do a deal of good to the masses at large, and it makes dentistry popular. In our large city to-day there are only two schools that give partially gratuitous services to the public. This is the only claim we may have as philanthropists. What we do in our own private offices is only for money.

Clinics are to me a sort of "post-graduate course," and that is what we need. I know the dentist soon forgets what little he has learned in the dental schools, and a post-graduate course, or scientific course, will aid us greatly, and on a basis of this kind I should be willing to contribute my share; a dental club would certainly fail, for dentists are not social enough to contribute towards a social club. There are other clubs that would give more for the money. The plan proposed appeals to me very forcibly. Why do we not establish a free dental hospital? Our dental colleges are not in a financial condition to do free work. They are not benevolent insti-tutions in that sense. Only the minor operations are done there, and for a majority of the work a compensation is received; and when there are so many poor people who require dental services, it seems to me very urgent that a free dental hospital, to which every respectable dentist should contribute his amount, should be established at once in large cities like Boston. In smaller places, of course, they are not so much needed; but when I think how many medical hospitals there are in this city, and not one dental infirmary

or hospital, it seems this is where we ought to begin. That is where you want your clinics, and here you will get the sympathy and respect of the masses.

Dr. I. J. Weatherby.—Dr. Werner has referred to the numerous hospitals in the city, impliedly, that they are free: a great many are free to the patients upon the payment of ten, fifteen, and twentyfive dollars a week for the privilege of being treated. Now, I think the dental schools of Harvard and Boston are as generous in their operations and arrangements as are the medical colleges. Certainly, if we should have a free dental hospital,—and it has a beautiful aspect, and would work an excellent end,—there would be a still louder cry among dentists that their patients were being taken from them and operated upon gratuitously. The fact is, we have dentists in the city of Boston who keep a sort of hospital of this kind all the year round,-making teeth for five dollars and filling for almost nothing rather than leave the patient go. We have a sufficient number of them to make a dental hospital almost unnecessary. Then, again, it requires a great deal of money and time in order to carry out the plan as presented by the excellent paper of Dr. Atkinson, and in its fulfilment I should fear a repetition of the experience of the Boston Dental College; there you may see the wives of aldermen, and I don't know how many other people who are well able to pay for dental services. Our profession demands support from the public in so far as it is intelligent in its work, sensible and practical in its operations, and I don't think that a plan of this kind would succeed at all. There is also missing among the profession of Boston that homogeneity that would lead them to support a club of this kind to any great extent. It has its beautiful aspects: but until the Boston dentists "come to the altar," and are thoroughly converted in the propriety and necessity of giving the public at large a larger share of their time, it will not succeed.

The colleges are doing good work. They charge a fee for gold fillings, a very small one for amalgam, and do their work reasonably well. They have failures, but there are failures outside of the college clinics; in these institutions the work done under the supervision of a competent demonstrator is generally very well performed. Whatever will conduce to the good of all generally concerned I shall heartily second, but I do not wish any "will-o'-the-wisp" institutions started which will, in their failure, bring discredit and disadvantage to those engaged therein.

Dr. George W. Lovejoy .- I cannot let this opportunity pass

without expressing my appreciation of Dr. Atkinson's paper. First, in regard to thoroughness. I think the Executive Committee of this Society has exemplified this in a high degree. Then, I think, the dental home, as proposed by Dr. Atkinson, an excellent idea. It would certainly work well. We could commence on a small scale and make it a place where any dentist could go and get any instrument he wants, or perform any experiment,—the making of a crown, for instance. It would be a sort of "home comfort" for him, and that is what we want for dentists,—home comforts and sociality. In Montreal no liquor is allowed in our club, and its absence is marked by many advantages. There is no doubt that the profession would be very much advanced by the establishment of a dental home.

DISCUSSION ON DR. PARRAMORE'S PAPER, "STERILIZED SPONGE FOR

Dr. S. H. Guilford.—I am very sorry to differ with the essayist, but from my own experience I am compelled to do so. In capping the pulp two or three things have been proven in the past: one is, that in doing so we must not irritate it in any way, either mechanically or medicinally; the second point is, that we dare not produce pressure upon the pulp because it will not stand it; and the third is, we must not allow any space to exist between the pulp and that which overlies it.

We all remember how many years were taken with the idea of capping pulps with oxychloride of zinc. It was used for twenty years, and with apparently good results. However, the pulps died, -partly from the irritation caused by the zinc chloride, and partly from the pressure of the material itself. Its use for this purpose was then discarded; it is used to-day in connection with other materials, but not by itself. In olden times they used to cap nerves by striking up a disk of silver to cover the pulp, but this left an air space. That was proven after a time to be bad practice; we found that the pulp, having the opportunity, forced its way through this opening and was strangulated,-irritated by the ragged edges of the opening and strangulation following. Then, again, it was thought that gutta-percha, being inert, would be good, and it was used for a time. It took only a few years, however, to demonstrate the fact that pressure was produced, or with that cap we had space, and that space resulted in the death of the pulp.

In regard to medicinal agents, those that would chemically

irritate would not stand. From these and other failures we learn that the pulp will not tolerate chemical or mechanical irritation. Now for the remedy: We must use some substance as a covering of the pulp that will not produce pressure, and for this we can take some of the different varnishes or resins and coat the pulp with them in such a way that it will afford a good covering for the pulp. Then we can place in something that will not irritate it, and then upon this we can introduce the harder substance. In the use of these resins we have perfect adaptation and no space, and can cap pulps with them with a great deal of success.

In capping there are various methods,—some using varnishes, copal, etc.; others take Canada balsam. Dr. Francis, of New York, a great many years ago, recommended equal parts of Canada balsam and chloroform, dipping into this a piece of letter-paper cut a little larger than the opening into the pulp. Over this he placed oxychloride of zinc. I have used this very successfully, however, substituting Japanese bibulous paper for the letter-paper. In the use of sterilized sponge you put a rough substance upon the nerve, the contact of which will certainly irritate that delicate organ. Then, again, sponge is composed so largely of mineral elements that it is necessarily a gritty substance, and I therefore do not think it is best for a capping.

Dr. T. H. Parramore, Hampton, Virginia.—I think that sponge is better than anything else, and my experience has proven it. I first thoroughly sterilize a sponge and place it upon the nerve when I insert the filling. There may be some irritation for a short time, because I have known the tooth to ache for a time after filling; but in practice I could regulate the pain fairly well, and the pulp did not die. At first I thought the pain was caused by the death of the pulp, but I found in refilling the patient complained of sensitiveness to the cutting of excavator as well as to thermal changes. Some of these fillings have been inserted as long as two or three years, and it has been so successful in my hands that I am determined to give it a fair trial, and I think the principle is right. The sponge, as I understand it, protects the nerve against pressure, and again, there is no space between as when we used the caps, about which Dr. Guilford spoke. The sponge is pressed against the pulp and not into it. The pulp, as I understand it, must be irritated before it forms secondary dentine. This method of operating was suggested to me by the use of sterilized sponge in the treatment of ulcers.

A month or two ago I had occasion to fill a lateral incisor for a

lad sixteen years of age. I referred to my books, and found a note there that the nerve had been exposed and had seemed irritated. I removed the oxyphosphate, intending to leave some as a protection against thermal changes; but unfortunately the whole of it came away, and I discovered the pulp covered with dentine; I could distinctly see the point where it was exposed before. The sponge had disappeared entirely, and no remains of it could be found. The tooth was not dead, because very sensitive in excavating. There is no trouble further than a little sensitiveness to thermal changes.

Another case was that of a young man, in one of whose teeth the filling had only been inserted about six months. It was a lower lateral. I was going to put a crown on the canine root, and my reason for removing the temporary filling was in order to get more room to operate when the crown was attached. In this case, as in the other, the whole of the oxyphosphate accidentally came away, and showed the nerve in just about the same condition as when I covered it six months before. I refilled it, inserting another piece of sponge, and have not seen him since. His sister, however, was in the office week before last, and stated he had experienced no trouble with it.

As I stated before, it is new practice with me. I do not know whether others are using it or not, but until I have evidence that it is unwise I shall continue to practise it. If it is not as I think it to be I shall certainly discontinue it, and will advise you all.

Dr. W. S. Elliot, Hartford, Connecticut.-I was very much pleased with the paper, but the doctor leaves the subject in an unfinished state, inasmuch as he does not give us the philosophy of the action of the sterilized sponge. He speaks very distinctly of the issue of the protoplasmic mass into the pulp cavity, but gives us no instance where there has been a union of the sponge with the protoplasm at all, and if I understand the process of repair, it is through the action and the function of the protoplasmic cells. No matter if there is an issue of protoplasmic mass beyond the point of exposure into the cavity of the tooth, I do not see how secondary dentine can be deposited or organized. This must be beneath the point of exposure. As I understand the use of sterilized sponge, the protoplasm with the sponge acts both mechanically and chemically, and is used up in the new tissues. The doctor does not give us any rationale, merely presenting demonstrable facts, which I do not understand. I do not see why any other substance should not do as well. I think the physiology of repair exists beneath the point of exposure, and is governed entirely by the protoplasmic cells which in their function produce the secondary dentine, or rather, not the dentine proper, but merely classification of lime salts. Will the doctor not be a little more explicit and give us a little more knowledge of the action of the sterilized sponge upon the pulp?

Dr. Parramore.—In a paper read before the Southern Dental Association I enlarged upon the subject, but in this I have avoided it. I did not care to repeat that theory again, and I did not expect to write an article for this meeting. I promised to give a clinic, but stated I had little time to prepare a paper. My belief was, however, that the sponge invited a deposition of germinal matter into its meshes, there to produce secondary dentine. My theory is, it allows germinal matter to collect at the point of exposure rather than in the body of the pulp.

Dr. W. S. Elliot .- It is difficult to accept.

Dr. Weatherby.—The paper is a very good one; but while I believe the doctor to be a very truthful man, the idea that sponge will take up protoplasmic matter and become secondary dentine I cannot fully accept. It must be in absolute connection with the pulp, and the process of repair goes on from this organ, and not from the protoplasm in the sponge. I believe he did not state that when he had removed the oxyphosphate fillings he found new dentine had been formed.

Dr. Parramore.—Yes, I mentioned one case.

Dr. Weatherby.—I have my doubts regarding the physiological results of the operation. I have only to suggest to you a most excellent capping for pulps,—"spunk of white birch," which is found on birch-trees that have been dead for some time. It is perfectly white, and its porosity favors its use. Coated with Canada balsam it can be placed directly over the pulp, and it has sufficient resistance to prevent its depression on the pulp by the presence of oxychloride, provided the latter is mixed to a proper consistence.

Dr. J. Bond Littig, New York City.—In regard to the use of sterilized sponge, the only advantage I see in that form of capping is its use on exposed pulps. In this pathological condition there is a slight secretion, and by placing the sponge over it is taken up. In general treatment the secretion oftentimes becomes putrescent and destroys the pulp under the capping; but in this method, the sponge being absorbent and itself thoroughly sterilized, we might look for some good results. That is the only advantage I can see in the use of the sponge.

The President then introduced Dr. J. N. Crouse, Chicago, Chairman of the Executive Committee of the Dental Protective Association, who spoke as follows:

THE DENTAL PROTECTIVE ASSOCIATION.

I have been querying since I came to Boston whether I had not made a radical mistake in the formation of my pet scheme,—the Dental Protective Association,—in not first launching it in Boston in the Massachusetts Dental Society. It seems to me it would have been a very proper thing, as you will remember it was a hundred years ago when the first rebellion against oppression was demonstrated in Boston, when the fifty men, rebelling at the imposition of the foreign government, threw out the contents of the vessel and refused to submit any longer; and when, by a process of starvation, the English government expected to bring them to terms, you remember how the other parts of the country came to their rescue by aiding them with food that kept them from perishing until, finally, the end was accomplished and the independence of this country was secured.

It might have been proper to have withheld the formation of my Protective Association until this meeting, and yet the ground I have gone over and good I have accomplished I do not regret; only it might have been preferable to have brought it here first.

First, What is the object and what is this Protective Association of the United States? Heretofore, you will remember that when we wished to defend ourselves it has been by subscription, always costing the individual much more than the small sum that is asked here. After casting about it seemed necessary to form a permanent organization, and under competent legal advice we formed a corporate body under the laws of the State of Illinois, which required that we should have a board of directors. These are the responsible parties for the body. It leaves the members free from any harassment if such an attempt is made, leaving it for the board of directors to do the work and receive the brunt of the attack if it comes from the opposition. Now, all who have examined the plan of organization will see that the membership is on a basis of ten dollars. Each member signs the constitution and by-laws and pays ten dollars. In signing you agree to submit to a further assessment of ten dollars. There are enough men in the dental profession who will come into this organization to preclude the necessity of further assessments.

The object of the Protective Association is, first, to take care of what is generally admitted to be an imposition upon the dental profession,—the matter of the International Tooth Crown Company's patents. The International Tooth Crown Company, as you know, own several patents: I think I have the record of twentysix in my satchel. It is true that many of these patents in themselves are harmless,—that is, they are harmless if you have any means of defence. The International Tooth Crown Company have a decision on one patent in their favor, and that is the gold bridge patent. In their suits, which were held in New York, that was the only patent in which they were sustained. The other patents this company have taken to the Supreme Court of the United States, where the suits are now pending. Besides this bridge, they have a large number of patents, many of which seem to me very amusing. They start out with patents, and name them as "preparation of roots for crowns," patents for "cutting off teeth," patents on "destroying the pulps,-driving it out." There is also a patent on filling the end of this root, as the patent describes, before there is any danger of inflammation or suppuration. I do not know whether it is the danger of suppuration you are to avoid or whether it is the cedar stick driven into the pulp cavity. They have a patent on freezing a tooth so it will not be sensitive; also another on cementing a pin or post into the root of a tooth. They have, in addition, a patent on filling teeth with some fibrous material; also many other patents covering crowns,-ten, twelve, or fifteen of them,-which would seem to cover all the crowns ever invented. These patents on the crowns, if held to be good, would certainly decide that the Logan, Bonwill, and various other forms of crowns are infringements of some of these patents. If we remain quiet and they are sustained, the probability is they will take up everything else they can buy. They will come around with a mule-team, and if one thing does not suit your case they have another, so that if they come across a man who is not doing bridge-work,—perhaps he is destroying nerves,-they could torment him and the dental profession, and no individual alone could contest these patents, because it is too expensive. Therefore the necessity of some concerted action by which this imposition can be stopped. feasible and right that each individual should give his part to the The matter of ten dollars is a small sum of money as compared with the great amount of good that can come from it in other The Protective Association offer in return for this money and this membership to take care of all suits,-guarantee to take

care of them, furnish counsel and testimony, and relieve the individual dentist of all expense, bother, and trouble. If they are to be sued, all they have to do is to turn over the matter to the Protective Association and allow it to take care of the suit. This method of defence will make it very effectual. I heard of a remark made by one of the representatives of this company, which was, that the only thing they feared was that the dentists would organize a body and bring their strength in one mass. That was the only thing that could make trouble for the patentees. I am here, gentlemen, representing this Protective Association, with the belief that you will recognize it, and stand by each other.

The dental profession are more ignorant on the subject of law and patents than any other thing. You need not be surprised if the Supreme Court of the United States sustains the patents now before it in favor of the Crown Company. We rather expect it, although we hope it will not do so; but just as soon as we hear that the Supreme Court has gone against us, that is just the time when we will really begin our defence. If the company have the decision in their favor, then they will apply all through the United States for injunctions against the dental profession, because the profession, as a mass, have infringed their patents. When they do this, it is the object and aim of the Protective Association at that time to prepare a new record and try these cases over again on the testimony we have gathered. I have received a large number of drawings, and the names of the parties who are wearing crowns and bridges, in response to the circular I sent out. It is the purpose of the Protective Association to have a full and complete record ready to bring into court at any moment, in any place in the United States, to apply on the subject, and thus compel the International Tooth Crown Company to fight the battle over again, and fight it on the merits of their patents. Before that time comes there are suits now pending in the Supreme Court which the International Tooth Crown Company confidently expect to have decided in their favor. Mr. Offield, on the part of the Protective Association, says, "We must not be surprised, and must be ready for the result." If they continue this suit before the Supreme Court, that only brings the Low bridge up, so it leaves little chance for the profession to have a trial. But we can make them come into court and try the case over again. When the suit was tried in New York, of course it was new to the profession, and there was much evidence presented that was not pertinent. The responses of the profession were not very liberal, either, so it was with my meagre means they accomplished what they did in that suit; and when I speak of that in company with the record of the Protective Association, I do so wishing you to understand that it is not in the form of criticism; but we have been working a long time on this, and we have more to show up the next time.

It is the confident belief of the attorneys of the Protective Association that we have all the evidence necessary to fight every patent now owned by the International Tooth Crown Company, and Mr. Offield is not a man who would speak unadvisedly. I had expected to have him here and present the legal part of this matter to you in much better form than I can do.it; but he is interested in some other patent suits, and was called suddenly home to Chicago.

Another subject of which the profession seem very "scary" is the thought of what their treatment will be providing the profession do not come up and give us evidence enough to win our suit. They say, "Suppose you do fight and lose,-then what?" Will they not be much harder on us? I want it understood that the company have established their rates of royalty. Any court will prevent them from increasing the royalty on the patents upon which they now demand a royalty of the dental profession; and it is a little surprising to see how far that company does intimidate the profession all over the country. There were a great many patentees before the first of January. Since that time there have not been so many. This Protective Association is not only to defend ourselves against the present imposition, but they may assail us where we cannot afford to go to law, and at a time when we cannot afford a permanent organization. We ought to have one thousand dentists in the Dental Protective Association before long, and should have five thousand before we leave off. That means fifty thousand dollars. We are under no expense except for our attorneys and printed matter to reach the profession. That will be lessened as they respond promptly. We are going to keep this thing going until we get there. I want you all to take home some fire with you, and kindle the fire about you. If we get this Protective Association fully organized, no man knows what benefits will come from it as a permanent organization. If any of you have been where you have not had a bank account, and have had a lot of bills hanging over you, and no money to pay them, you know that it is a mighty uncomfortable feeling; and if you have not been there I have. This movement will give the dental profession a bank account, and protection, whereby the strength of the dental profession can be brought together to take a stand on any proposition that is offered.

Further than this, we do not look for abuse all the time; but what could we do if we had the interest on fifty or one hundred thousand dollars, in the way of scientific work? We could employ experts to cultivate these microbes and tell us what they do and how they originate. It would be a great idea to have such men as Black and others, who on account of feeble health cannot practise, go into their laboratories and work out what the dental profession has not time and the ability to do.

I want to say just here that every member of the Massachusetts State Dental Society, and the friends who have not responded to the circular I mailed, should do so before they go home. Then I can feel that I have a friend here and there, and that the Protective Association extends all over the country. I will not need all of the money until February. After it numbers one thousand or fifteen hundred, the membership fee may be increased to twenty dollars or twenty-five dollars, so you had better hurry up and get in.

I do not want to take charge of your Society. I would suggest in your case that some of your live fellows should start around quietly while the proceedings are going on and get the members to sign, and take their ten dollars. When I get home I will forward a receipt, etc. If they have not ten dollars with them, get a piece of paper and put down their names, stating, "We join the Protective Association, and will forward our dues not later than the first of February or March, 1890."

There has been considerable said in the journals, and other places, as to what the International Tooth Crown Company was going to do with all of us fellows who are interfering with their game. I have had several letters myself. I have also been notified that I shall be held responsible for slander and libellous utterances; that they will commence suit against me for infringement of their patents, and for damages. I say I live in Chicago, and that they had better commence, and not talk too much. They have also threatened our treasurer in two or three letters, to which he has replied, "I do not become responsible for anything the Association writes, but I receive the funds here." They dictated a letter in which they wished him to retract some things in the circular letter in relation to the matter.

Then there is a suspicion in my mind that there are some others who are getting seared. I have been trying for some time to get some of the leading journals to give you the information that you ought to have from month to month. They say, "We have consulted our lawyer, and we may get ourselves in trouble." They are afraid;

but I have offered to be responsible for their suits and damages. There is a little whispering around the offices of some of these journals that the Dental Protective Association will get too much power. I have had some of the dental dealers who run journals come to me and say, "Crouse, what else are you going to do? What are your plans hereafter?" I say, it is to work off what we have on hand first, and see what comes afterwards. They want to know what influence this Protective Association will have on their business. I do not believe the Association has any idea of interfering with their business. If there is any line of business that is imposing upon us, and we investigate and find it out, we may kick. I predict that the next warfare will be against the journals that do not do something for me. I have told them that the time has now come when they will have to choose whom they will serve, "the Lord or the devil."

DISCUSSION ON DR. CROUSE'S REMARKS ON THE DENTAL PROTECTIVE ASSOCIATION.

Dr. J. N. Crouse, in answer to a query as to how many members there were in the Protective Association, said, "In ten hours the International Tooth Crown Company would know how many we had if I told you. The responses we have are very good. It is twice as large as any organization of dentists existing in the world.

Dr. George A. Maxfield, Holyoke, Massachusetts.—I understand the names of all those joining the Association will be kept secret?

Dr. J. N. Crouse.—No one but myself knows who belong. They are not prosecuting any of our members yet.

Dr. Merriam.—I move that a committee be appointed by the chair to go through the audience and solicit subscriptions while the discussion is going on.

Carried.

Dr. G. L. Curtis, Syracuse, New York.—Not long ago I was doing work under the Low patent, and by special agreement they came to my office and taught me their methods, and after teaching me they asked me to take out a license, which I refused to do. Some time elapsed, after which I was sued, or a suit was opened to get a judgment for infringing their patent. The New York dentists and attorneys drew up papers which were so strong that the International Tooth Crown Company did not wish to continue the suit. Mr. Alvord, being at my office two or three weeks ago, asked me what I was going to do. I replied, "Try the suit,"—that we were anxious and desirous of making this a test case. He asked me if

I was a member of the Protective Association, and I told him I was happy to say I was. He then said my suit was not the one he was going to contest. This is the point I wish to bring out. I believe it is our duty, and one we owe the profession, to support this Association, even though we never make a crown. Its force will be felt in the future, and it occurred to me that there are many here to-day who would be glad to contribute even though they never infringe a patent.

Dr. George A. Maxfield.—I want to give an incident of my experience with Mr. Alvord, not quite two years ago. You will remember that this Society, also the Connecticut Valley Society, took the cue from the New York men, and took subscriptions of five dollars to help defend the suits and bear the cost. Mr. Alvord came to my office a few days after the meeting and asked if I knew where the money went to. I stated it was in good hands. He said, "I want to tell you something. Dr. Gaylord, of New Haven, owes his lawyer for one-half his services: the money is going for this, and you had better inform the members of that." You can see that was a downright falsehood.

Another thing we want to take into consideration regarding this Dental Protective Association is the character of the men who have taken hold of it,—an evidence in itself of its stability. Not only this, but think of the time these men are giving for our benefit, to say nothing of the money they are spending. They leave their practice, as Dr. Crouse has, coming all the way from Chicago in order to present this matter before us, and give us the full benefit of the defence for simply the ten dollars.

Dr. I. J. Weatherby.—A remark recently made, which would imply that the money which was raised by pledges for the defence here in Boston of the rubber suits commenced against myself was not properly applied, I would like to correct. I know where every penny went to, and where five hundred dollars additional from my own private purse went. There was not enough money to pay the expenses of the court and lawyers, and five hundred dollars came out of my own pocket which has never been repaid.

Dr. L. D. Sheppard, Boston, Massachusetts.—The charge Dr. Weatherby refers to has been misinterpreted, and was understood by him to apply to the first case in which he was interested. The statement made by the former gentleman is true, nevertheless, of suits that were carried on against the Dental Vulcanite Company. There were multitudes of them; in fact, their method, as will be remembered by those who are old enough to go so far back, was a

movement skilfully planned and carried out. The whole history of the contest with the Dental Vulcanite Company was one of strong oppression, with plenty of money, against feeble defendants, with little money, and, of course, the victory was always on the strong The first suit here in Boston was a weak one because the profession did not come to the support of the private men who dared risk their money in defending that suit. There is no one who knows anything about the suit but will say that the money was put to the right use. I say this in justice to Dr. Weatherby. for it was said at one time that it was not an honest suit: it failed from lack of means. The same result would follow with this new company, which is the same old company, as is well known. The same men are in this company, and their methods We are just as sure to be bound hand and foot by the International Tooth Crown Company as we sit here today, if we do not manfully, hand to hand, support this movement. I stated two years ago before the Massachusetts Dental Society, when I was settling with the International Tooth Crown Company, -at a time when I could not afford to do otherwise, -that if I saw an occasion in which I, being the defendant in any imposition practised upon the profession, had to depend upon the pecuniary support of the profession to help me pay my bills, I would settle with the company, pocket the imposition, and decline to be the defendant. I will never be an individual in a suit in which I expect the support of the profession. I say so, perhaps, with shame and sorrow, but there has never been a time, since the trouble with the Dental Vulcanite Company to the present time, that I have not given my help and labored to collect money in which others were willing to be the defendant.

I honor any man who will so far neglect his private practice and give his time, which is worth to him thousands of dollars, as to become the target for abuse and the instrument against which a powerful imposition aims its shafts. I bow to that man, and say that he is a braver and better man than I am. If the members of the Massachusetts Dental Association, numbering perhaps one hundred men, do not send one hundred subscriptions to Dr. Crouse, I shall be able to repeat what I said a year ago last December,—that I was ashamed of my profession. In the whole history of the contests, from the first contest against the Vulcanite Company to the present, in every action in which generosity was required of the profession, the rule has been that a dozen, fifty, or one hundred men came up to the mark when there should have been five or ten thou-

sand! Just so sure as this movement meets with a feeble response from each member of the profession and the Society, and they withhold their support of ten dollars, just so sure will the time come when a suit against an obscure and poor man here, another suit against another man a little distance away, and so half a dozen in this State and half a dozen in another State, will produce an accumulation of judiciary decisions that will be so strong in favor of this Crown Company that its claims will be sustained in the courts, and we shall be bound hand and foot. It is a skilful part of warfare by which defenceless detachments, situated far apart, are taken one by one and conquered, until the whole foe is conquered.

I speak with some earnestness for various reasons. I was asked before this meeting if I would say something on this subject. Whatever I did individually for my own protection, at a time when there was no help and no organization, I have no hesitation in acknowledging. I should do it again under similar circumstances. Always when there has been money to be raised I have been on the side of the profession, and I am to-day, and I want to add my earnest request that you all be patriotic and give your support to a movement which, if it fails, will probably be the last attempt at defence from many impositions.

Dr. H. C. Merriam.—There is one point entering into the Vulcanite Company's suits which is different from the case of the Tooth Crown Company's. There we had one or two patents to fight,—Goodyear's and Cumming's. In the present case they have a multitude of patents, which gives them a powerful influence over the profession; moreover, up to the present time there has been no limit to their scope, and they have accumulated a vast number of inventions, which was not possible with the Rubber Company. You go to the clergyman or lawyer, and his services are at your command. Not so with the dentist, however, for he in this case will depend upon the will of others for the right to practise his profession: he cannot do this unless he has a license.

Those who want to take an honorable position in an honorable profession cannot afford to pass this opportunity by. It is a question of honor, gentlemen,—our personal liberty,—and if you are not taking part in it it is an individual shame. We must meet organization with organization, and a company must be formed that is to cover every part of this country, and gather just as minutely as in the Patent Office the records of our inventions and resources of our profession, that they may be known as the source from which our

strength has come in every movement of this kind. We have no realization of this power of patents, what a sly thing it is to take our title from the profession.

Dr. I. J. Weatherby.—Why was it that the suit I mentioned failed? Do any of you know? There was no money.

Dr. L. D. Sheppard.—Josiah Bakon once told me that the vital mistake was the want of money.

Dr. I. J. Weatherby.—If we had had the money in thirty days that case would have been appealed, but some thought it a dead horse, and that was the end of it.

Dr. W. X. Sudduth.—With the permission of the Society I would like to speak of a personal matter.

Permission being granted, Dr. Sudduth proceeded to unfold the plans and purposes of the company publishers of the International Dental Journal, which are well known to all of our readers and need not be repeated here. Regarding the relation of the Journal to the Dental Protective Association, he said that before the movement was brought out Dr. Crouse and he had consulted in regard to the best methods to adopt, and that the International Dental Journal had been pledged as the organ of the Dental Protective Association. We have spared no pains to bring the movement forward and urge the necessity of organization upon the part of the profession. Owned and controlled as our journal is by members of the profession, it cannot do otherwise than stand by any movement that the profession as a body may think wise to adopt. We therefore pledge the hearty support of the Journal to the Dental Protective Association.

Dr. Merriam.—As one of the stockholders of the International Dental Journal, I should say that in my opinion it would be time for the corporation to cease its existence if it did not uphold such a movement.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, June 1, 1889, at the hall, Arch and Thirteenth Streets. President James Truman in the chair.

The subject announced for the evening was Patents, by W. G. A. Bonwill, D.D.S.

Dr. Bonwill.—It has been my intention for the past four years to bring before you what I have to present to you to-night; but

before making this presentation I wish to have a fair understanding with this Society. I have brought one thing here that I do not propose to give you outright, but will ask you what I shall do with it,whether I shall give it to you, or patent it, and make money out of it. I have tried the dental profession in many ways, and I suppose they have been very much tried with me, but I think it is not too late to have a fair understanding; and in this agreement with you I want the liberty to take care of myself with regard to my inventions, on which subject there has been so much said lately pro and con. I wish to explain to you how I have always stood regarding patents; and then, if my conduct has not been consistent with the ethics of this Society and the general ethics of the dental profession, I shall myself present a charge against myself, so that it may be decided, gentlemen, whether I have acted right or wrong in this matter. My object is for you to answer me if I have erred. On the other hand, if there is nothing I have done, then please be men enough to say so and publish it. I have certain rights in my own Society, and as I bring two of the best things of my life to present to you, I want to know before I go any further whether I have a right to say anything I wish to in regard to defending my course for the past thirty years. If not, I will hold myself aloof from the dental profession hereafter.

Dr. Sudduth.—I see no reason why Dr. Bonwill should not present his views on this matter. I therefore move that he be allowed to give expression to them before the Society.

Dr. Head.—I second the motion, and hold that free speech be allowed Dr. Bonwill.

The President.—It is not necessary; Dr. Bonwill has always a right to express his opinions. But in view of the fact that he has asked for a general expression, all in favor of Dr. Bonwill being allowed full use of the floor, etc.

Carried.

Dr. Bonwill.—I would ask, further, that these proceedings be published either in the International Dental Journal or Cosmos.

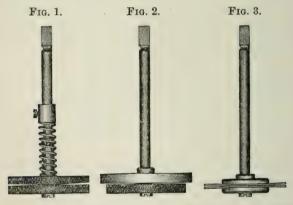
Dr. Sudduth.—They will be published in the International.

Dr. Bonwill.—I have brought to you to-night three things:

1. A little instrument,—one of the most important I have in my office,—a nerve-broach reducer. Very frequently in getting into the finest pulp canals you cannot secure a suitable broach in the market for the purpose; nor can you make one by the most careful filing with anything like satisfaction. Three or four years ago, by a mere accident, I placed two corundum wheels on my

laboratory lathe,—simply one small one that had been worn on one side at a slight bevel, and a little out of line, merely as a nut to hold the other,—leaving a slight space between them, as in cut. It immediately struck me that by placing a coarse corundum wheel and a soft rubber disk on the same mandrel, and screwed together, you could rasp down a broach to any desired size. By experimentation I found it was better to use two shellaced paper disks, and to have on either side of these a disk of soft rubber, so that it will keep these disks so close together that in passing your fine wire in between them while they are revolving rapidly, you can cut the broach down to an almost infinitesimal size,—the finest you can cut steel. I have never had anything that has given so great satisfaction; Swiss and English makes both failed me.

For reducing steel piano-wire, evenly tempered, use two corundum wheels kept together by a coiled spring (see cut), and afterwards use paper disks with the soft rubber on either side, for fine work.



Bonwill's devices for making nerve-broaches from stub tempered steel piano-wire, and for reducing Swiss broaches to an infinitesimal size.

DESCRIPTION OF APPARATUS.

No. 1 consists of two sharp-cutting corundum wheels, used dry, with one at a slight bevel, as shown in cut. The outer one is screwed fast to mandrel made for the purpose, and the inner one is shellaced to a thin sleeve, which moves lengthwise only on the mandrel, and is controlled by a coiled spring, the tension of which is regulated by the movable collar and screw on the mandrel nearest the chuck of engine hand-piece or lathe. The collar holding the corundum wheel is prevented from turning on the shaft by a pin

running through it, and on a flattened surface of mandrel. This is for heavy work of reducing tempered stub wire, but will do so to a very fine broach.

No. 2 is a shellae and corundum wheel and a soft rubber disk of plain packing rubber on the inside next to the hub on mandrel, and both secured tightly to keep from turning. The rubber disk should be of greater diameter to allow the broach to be guided in between them easily. The edges at the periphery will be slightly apart when screwed up tightly. Both revolve at the same time.

No. 3 is made of two one-inch shellaced corundum paper or cloth disks, coarse or fine,—better medium for the last, which is used for very delicate work,—and on both sides of these a half-or three-quarter-inch soft rubber disk, cut from packing rubber and placed around; all screwed tightly on mandrel. There is no trouble in making them from the material every dentist has on hand, if it be only the paper disk.

In making No. 1 the bevel should be very slight and perfect, as the broach is so small. The inner wheel should have controlling it a very stiff spiral spring, nicely adjusted, to permit the broach to go down between the wheels. While the broach or wire is being cut it should be revolved constantly to keep it perfectly round, and the point kept in towards the centre of the wheels, in order to more perfectly point it. They are held by a small chuck handpiece while being cut, and when in use are fastened to a very light handle.

When reduced to the desired size the barbing is easily done by taking an enamel chisel, very thin on the edge and very hard. Place the broach in a sliding tube-holder or chuck—same as for holding it securely while cutting down with the corundum wheels -and hold under it a piece of glass or any hard, bright surface. Hold the chisel at ninety degrees angle to the broach, commencing near the point, and with the blade of the chisel held on the broach, not directly at right angles with it, but with the right edge or corner of chisel turned farther away from it, so as to throw the barb up the right side of its length, in order to insure its catching the pulp. If cut directly across, at right angles, it will not do so nicely. A slight pressure on the chisel will raise a barb-be it ever so slight—that, if cut to the right, will be sure to catch the pulp every time. Do not make more than three or four barbs, and close together at the point, and not so deep as to endanger its main strength. This can be very successfully done by a little practice, and should always be made at your leisure, that it be not hurried

and best results follow, which can only come from a delicate and experienced touch.

2. I made about two years ago, when Dr. Woodward presented his new matrix, the appliance I present to you here to-night. It is applicable in a great many cases. It is easily adjusted, and you can make a very perfect operation on marginal cases, and it can also be removed without difficulty. It is adapted for gold or amalgam, and allows of the matrix being removed without interfering with the perfect contour of the filling, which can be made in this way only, since it fits snugly the cervix, and very little, if any, trimming will be needed there afterwards. When there is a cavity opposite to the one being filled it should be filled with pink guttapercha to back up the divided matrix and prevent it springing back into the cavity. Each jaw of the matrix is double, and can be turned end for end. It is also shaped on both sides, that cavities in adjoining teeth can be filled without change.

This matrix will be more easily understood when I tell you to shape, either in brass or hard rubber, a piece to fit perfectly the buccal side of a bicuspid or molar, and made to run half-way through; and another from the palatal or lingual side adapted thereto, and also running through to meet the one from the buccal side. These, shaped nicely to the contour of each tooth, are now attached to a clamp such as is used for rubber dam, to a universal clamp by a thread and screw, to allow the jaws to adjust themselves to the surfaces. These jaws can be unscrewed and others substituted.

3. The third invention is something to which I wish to ask your serious consideration, -whether I shall patent it or present it to the dental profession. It is a right-angle plugger, and as important in its way for either the electrical or mechanical mallet as the right angle is to the hand-piece of the dental engine. Last January, when surrounded by my family at dinner, the idea of this instrument flashed in my mind, and I knew at once, without trial, it would prove satisfactory. I had long felt the need of a right angle for my pluggers, and this accomplishes it as perfectly as if it were simply filling in a straight line. With it I see no further change needed in these instruments. It fills a gap not hitherto approached. Many cavities heretofore that should have been filled with gold were made with amalgam. It is this I now offer you for a verdict. But before presenting it I desire to speak of my position as a patentee. You must all grant there are two sides to every question, and this one is no exception to the rule. A great effort was made

by Dr. Merriam, some time ago, to have it understood that we cannot be professional unless we give unreservedly everything to the dental profession, no matter what we get up and what it costs us in the shape of time, money, etc. His arguments were merely assertions, and they have no weight unless backed by evidence. Personally, I have but two things for which I feel answerable, and these I will mention. Before I had much experience, and while in Delaware, still circumscribed by unfavorable surroundings, with very little encouragement, no dental society, and in communication with only one dentist in the State, on the spur of the moment, in my experiments, which I commenced early in my career, I thought of electricity for the purpose of removing nerves painlessly and obtunding sensitive dentine. I had no sooner patented this than I saw I had made a mistake. I never mentioned it as a patent afterwards. I found it good, but experiment gave me something better,—rapid breathing as an obtunder. I gave all to dentistry. The only other incident in my career for which you can censure me, as I look at it, would be when I came here to live and placed my electric mallet and dental engine on the market. (I have never asked a man to purchase one of my inventions.) After that I had received many strong testimonials from Drs. Darby, Guilford, and others, which I published in a circular, placing it on the stand with my exhibit in the Franklin Institute, where I was afterwards awarded a silver medal. In it I merely stated the virtues of those instruments. I was afterwards sorry for doing it, as some of the gentlemen took exception thereto. It was not done with any bad spirit, or to make practice, for at that time I had an income that would surely keep the wolf away. I only thought it was right to give to the world the testimonials in favor of the instrument used by leading dentists.

I have not patented everything that I have made. Numerous things have I gotten up which remain unpatented; one of the most important of which, when it is understood, is the "anatomical articulator." It was the first thing I ever did, and I gave it to the dental profession at the meeting of the American Dental Association, through Dr. J. H. McQuillan, and I do not think the proceedings show that I was even thanked for it. It was not discussed; it dropped flat. Another instance I will mention. I went to Saratoga to the American Dental Convention, and presented there the appliance that so much has been made of since by Dr. Talbot, of Chicago,—the "spiral spring" for correcting irregularities. A man sitting in his shirt-sleeves (and no gentleman would

do this in the presence of others) abused me most personally for presenting such a thing as that, even as a gift. I felt like going through a knot-hole. If anything would have dampened my energy, and put a bad spirit in me to never present myself before a dental society again, it would have been the action of this ignorant person. However, it did not stop me, as results since show.

Now, if you will look back you will see a number of appliances belonging to my engine that were brought out through my instrumentality by Dr. Arthur, of Baltimore, and at my suggestion, as his letter to me shows, the shellaced disk was made; yet I made no effort to patent it. The different corundum points, known as the Northrup forms, were gotten up at the same time as my dental engine,—in 1870. (The first engine put on the market was in 1871.) Then came the soft rubber disk, the hard rubber corundum disk, and the soft rubber corundum disk; rapid breathing as a pain obtunder in the treatment of sensitive dentine and extraction of teeth, which Brown-Séquard, of Paris, and other physiologists say was a new discovery and practicable; the diamond drill in dentistry and surgery, for dental engine; the pointed fissure burr to do away with the file in separating teeth for filling and anticipating decay, and finishing gold and amalgam filling at the cervix.

The first right-angle attachment to the dental engine was made and given in 1873, which was well worth a patent; the use of Japanese bibulous paper for pressing surplus mercury from amalgam fillings when placed in the cavity, which was as much of an advance in that line as was cohesive gold.

The little apparatus I now give you for reducing nerve-broaches from wire to an infinitesimal size cannot but be of universal use, as nothing before filled the breach.

Lastly, which should have been among the first, the application of a specific oval face to the pluggers for the electric and mechanical mallets, like the face of a gold-beater's hammer, which spreads laterally while packing in a straight line. This alone was enough. When realized and practised it will forever revolutionize the packing of gold by "wiping it in." It reduces to a certainty that gold can be almost welded to the surface of a tooth. It saves two-thirds the time and nearly all the labor, is easier to the patient, and prolongs the operator's life. When Herbst saw it he at once acknowledged that his method was anticipated years before.

One more thing given: Abbey's old-fashioned soft gold foil was, considered of no use under the mallet. For the first time I reversed the decision. In 1870 I demonstrated with the electric

mallet it could be used with smooth oval-faced pluggers, and welded the same as cohesive gold. It is no longer doubted. It made soft foil equally valuable and more so than cohesive gold, and the discovery was paramount in importance to all my others.

covery was paramount in importance to all my others.

For the first time in the history of surgery I applied the diamond drill to remove a stone two inches in diameter from the bladder of a female, using my surgical engine, with the many appliances connected with it.

The jack-screw for elevating fractures of the skull instead of trephining was an invaluable affair, and patentable.

All these I have made no effort to secure by patent. They are gifts. Are these not enough?

I have always considered that anything a dentist can make should be freely given; but when it comes, gentlemen, to instruments that are complicated and applicable to mechanical pursuits, then, when you attempt to step upon a man who patents a thing that is not only adapted to the dental profession, but hundreds of other purposes, you make a mistake. When it comes to instances where a man cannot make a thing himself, he will have to go to the manufacturer anyway. Take alone the electric mallet. Use can be made of it as a hammer for cutting stone, and for a great many other purposes. Was it right that I should simply give it away? Should I not go to work to improve and patent it, and then, if it was particularly applicable to dentists' use, could I not exercise the right the government gives me to put my money into it? Nearly two years expired before I patented either the dental engine or the electric mallet.

You all want to get everything as cheaply as you can. Now, when it comes to machines, to get these up to sell at anything like a low price, it must be done by the hundred or thousand. The more you order the lower the price will be. Surely somebody ought to be protected in their manufacture if you are to get these articles at a price fitting your pocket-book. I felt that, inasmuch as I had not the money to make these instruments as they ought to be, it would be perfectly right to put them in the hands of the Dental Company, which would put its money in it, which was done after making them practically a perfect success.

A gentleman who was just from the dental meeting in New

A gentleman who was just from the dental meeting in New York had the good feeling to inform me that I had degraded the dental profession more than any other man in it, simply from the patenting of my inventions and selling them out to a manufacturer. I thanked him. He said my inventions were the best on earth,

and I had sold them to him at a reduced price. Now, in the manufacture of these articles, if you made them yourselves you would soon find out the difference. They will not only be imperfect, but they never would be perfected. So, in my experience, if I had the ground to go over again, I would do the same thing.

The most potent argument I can give you as to the impracticability of giving away inventions when first made practical is in the history alone of my own inventions.

The anatomical articulator was given to the profession, and it took dentists twenty-eight years to grasp the facts demonstrated.

In eighteen years there has not been a valuable improvement placed on my dental engine, electrical or mechanical mallets. The high price paid me for them tells their value. What would have resulted had I given them? If dentists, with capitalists and manufacturers on their side, have not proven equal to the emergency, how long would these instruments have been kept in obscurity?

When we have in our ranks better mechanicians and more inventors it may be well to give away ideas and let others do the work of invention and improvement, and let many share the honors, which would be found "very easy." Any one entering into the manufacture of a new thing must go against the tide. Long years of fighting in introducing any new article must have backing. The experience of men in the past has led to laws which will secure not only an individual, but a nation, in the outlay made; and will do so for a number of years, until it will stand on its own feet and has arrived at manhood. If men and corporations could not have such protection, there would be slow progress, if really it would occur at all. Let any of you turn inventor, or even improver, and at once you will see whose ox is gored. You who know nothing of the practical workings of such matters cannot conceive what is involved in such work. Come to my museum of inventions of thirty years' duration, and you will tell me I have done right to secure myself against dentists and manufacturing companies, and made what I have in money and honors. If battling for a principle is correct in any way it is doubly so here, from the long line of work, and in many fields, that it has been my fortune to have placed before me. The law of preservation demands that we shall look after and rear our own children. There is injustice in the workings of all laws. We find it so in patents. It will always be so. Let us divide it and give to the originator what is his due, and which he will have if he has the right spirit. Such communistic ideas are not in keeping with the democratic age, and with all your "Dental

Protective Associations" you cannot down the spirit of an inventor. The wheels of time would stop and turn backward. Listen to me and for once stop to consider, and you will learn to be just.

These are the principal points I wish to make in regard to this in a business way. Another thing. Instead of making so much fuss about the Low crown and fighting it, as I told them the other night, they would do themselves infinitely more credit if some of them would look into the matter and bring out a better result. You would find very readily that you would not infringe upon it. Do you not know that there has hardly ever been anything devised but that somebody has improved upon it to a certain extent, and many supposed generic inventions blotted out?

DISCUSSION.

Dr. L. A. Faught.—I am very much interested in the instrument Dr. Bonwill has exhibited to-night. It seems to have only one fault,—the noise of the engine in packing the gold. There seems to be the same objection to it, in this respect, as to the right-angle hand-piece. Of course, the noise of an instrument of that kind on a very nervous patient would not be pleasant. It has excellent power, and undoubtedly does the work.

Dr. Bonwill.—The blow can be regulated. Much has been said about the noise of the mechanical mallet. Dr. Register thought that a rolling lug would do away with it. It is not, however, the contact of the projection on the wheel that makes the noise. A patient will tell you the noise is in the mouth itself where the plugger comes in contact with the gold.

Dr. D. N. McQuillan.—I want to say that to-day I put two people to sleep with the mechanical mallet.

Dr. Joseph Head.—I have frequently done the same thing.

Dr. W. X. Sudduth.—As I understand Dr. Bonwill, he will not give this plugger to the Society except the Society agrees to manufacture it and put it on the market.

Dr. Bonwill.—That is correct.

Dr. Sudduth.—In regard to patents, I think that I have made my position very generally understood on the subject heretofore, but will again say that I hold that the patenting of an appliance that has a use outside of dentistry, such as the principle involved in the electric mallet and such like instruments, is perfectly justifiable; also, that in case a dental instrument is complicated and requires the expenditure of capital to perfect and manufacture it, that in such cases the inventor has a perfect right to secure himself and

those connected with him, or those to whom he sells his invention, from unjust usurpation of his or their rights as original discoverers and perfecters of said invention; and that a dentist so doing should not be considered unprofessional for his conduct. In the case of such an invention the manufacturer places a finished product upon the market,—an article of commerce that is ready for use, such as a dental chair, engine, mallet, etc. But in the case of the Low crown and bridge-work patents an entirely different condition arises. A principle or method is patented, and the profession is compelled to assist in its application, and a royalty is demanded for the use of what should be free as air. Such patents are an outrage upon the profession, and he who will stoop to enforce them should be ostracized by all regular societies throughout the country. the same category should be placed all patents on simple contrivances such as can be made by the dentist in his laboratory, and all secret nostrums. This should be done not alone for the benefit of the profession, but for the good of the individual himself.

Dr. Bonwill.—What are your personal views in regard to Dr. Merriam's position,-that all men who do patent are to be ostracized from societies on the ground of unprofessional conduct?

Dr. Sudduth.—I have said that if dentists want to be recognized by the medical fraternity they must comply with the code of ethics of the American Medical Association. The professional phase of the question has already been discussed.

Dr. Bonwill.-Let me explain, and show how foolishly you are acting. Only a short time ago, at the last meeting of the medical men at Washington, Professor Harshley, of London, who has performed a great many operations, instead of feeling injured, or that the profession of medicine was lowered in its tone, had the kindness to say before the Society regarding the surgical engine which I left when I was on the other side, "This to one of your fellow-countrymen. Were it not for the surgical engine the operations that I have performed to-day could not have been very well performed." The best words I have received are from the medical profession. Professor Gross did not consider it lowering at all to have me stand by and perform operations he could not do. Not only that, but he has placed a cut of my engine in his medical work, where he speaks of it in the highest terms. If medical men notice in that way patented articles, and also men of such note, why should men who are attempting to attach themselves to the medical profession have anything to say against it?

Dr. Tees.—If you will look over the old dental journals and ex-

amine the matter, I think you will find that many things that have been given to the profession and published are now hidden away in the dark. Had they been patented and manufactured by the inventors, dentists would have been benefited by them. But little is now heard of the lancet beak or subalveolar forceps which I invented and presented to the profession in 1875; while the liliput furnace, that I patented and made it a special duty to introduce, is now in use by dentists all over the world. Who are the most useful among us, men like Dr. Bonwill, or those who are trying to exclude such as he from our dental meetings? They have been trying to do it for the past thirty years; they have tried to have oppressive ethical laws adopted by the Pennsylvania State Dental Society and by the American Dental Association, but the majority are opposed to them; they are not tolerated by these societies. At a late meeting of the New York Odontological Society, which has been hitherto conservative, the subject was again agitated in an essay and discussion. In the June number of the Dental Cosmos, in which the proceedings are published, Dr. White presents an able and sensible editorial upon them.

Dr. Joseph Head.—I think in a case like this, when the subject of patents is being discussed, every dentist should frankly state his opinions; for when any class of persons is reproved by popular opinion, it is only just that the adherents of that class should all stand together and express their sentiments.

A man who invents methods, the patenting of which cripples dentists in following out their own individual operations at the chair, does a great injury to the profession at large; but the man who expends his time and energies in developing the profession by inventing articles which must be sold, and which can with profit be used by dentists, I think has not only a perfect right to be remunerated for his time, but also a right to honor for his industry.

Dr. James Truman.—As has already been stated, it is important that each one should give as clearly as possible the position he occupies on this question. As Dr. Tees has stated, the subject has been a cause of contention for many years; but, for reasons easily understood, has recently assumed an aggressive character out of proportion to the matter involved. It is not a question of ethics, but is simply one of property, and it should, it seems to me, be discussed in that light and no other.

When an idea is conceived by an individual it requires time for its development. Months, perhaps years, must be consumed, together with a large amount of money. Now, this is capital invested

as truly as in any other business. After thus investing his thought, skill, and means, is the profession to step in and say to this man, "You must deliver that to us. The code prohibits you from receiving anything but honor?" Such is practically the substance of all that has recently been said upon the subject. Is not the statement too absurd to be the principle of action of a generous profession?

If Dr. Bonwill were to give the right-angle plugger he has exhibited here to-night to the profession, the result would be that every manufacturer would have it without cost; but do you suppose the dentists of the country would get it one dollar cheaper than right-angle drills are at present sold? The matter would be entirely in the hands of the dealers, and neither Dr. Bonwill nor the profession would reap the slightest benefit.

The medical profession is constantly brought up as an example. I know of no reason why we should follow that conservative body; but in their case they make use freely of patented instruments, and I doubt if they ever give it a thought.

I, perhaps, go further than some on this question, inasmuch as I believe it not only the right but the duty of every man to patent anything coming within the scope of the law. The profession, as such, has no more claim upon the product of a man's time and skill than a person has to demand of him professional services without remuneration.

Again, I hold that for the security of the "honor" so much talked about, a patent is the one essential thing. Without it he will most assuredly be robbed of the credit of the invention, as Dr. Tees was of his, and hundreds of others besides. We must accept the morality of the world as we find it, and not as we would prefer to have it.

This is not only true of appliances, but it is true of ideas. Some men say, as Dr. Merriam has contended, that when a man has an idea worked out he should give it to the profession. I would make this voluntary on the part of the individual, but I would call to a severe account the man who deliberately embodies an original idea in book form without due credit. If it were possible to get original ideas registered, I think it would be an excellent thing. The extent to which this sort of robbery has gone is not appreciated by the profession. A man gives the thought and work of months, embodying original investigations; the idea of money, or even honor, is not the incentive to action. He publishes the result in one of the journals. The next book that appears will in all probability contain his ideas, if not exact words, in its pages without

quotation-marks, and on the title-page the author (?) will refer to this gentleman as one from whom he has freely quoted. The next author will quote the preceding writer as authority for his statement; and in the course of years it seems a puzzle for honest writers to find the original man who formulated the thought into actual practice. This has been done over and over again, and there has been no prominent original writer who has not suffered in this respect.

I hold, as I should have said before, that every man must do the work as it seems best to him. If he feel it right to patent an invention, he should be allowed the liberty to do so, and not feel it necessary, as Dr. Bonwill has this evening, to come before us for our endorsement. I do not think there is a member of our profession anywhere but could say of him that his work in our profession has been equal, at least, to any other man in it, and that he should receive every honor for it.

Dr. Sudduth.—As I understand it, the right-angle mallet is to be used in conjunction with the Bonwill hand-piece?

Dr. Bonwill.—That is correct.

Dr. Sudduth.—I think some action ought to be taken regarding this right-angle attachment. It is not right that it be passed by without some action.

Dr. D. N. McQuillan.—It seems to me that we have a chance now to put ourselves on record as a Society. Dr. Bonwill has very generously offered us this instrument, and if by any means we can put it before the profession, we ought to do so. Here is a chance to do what every one has been looking for.

Dr. Tees.—I move that it is the sense of this meeting that Dr. Bonwill shall use his own judgment in disposing of his invention. Societies often have considerable influence in these matters. The treatment of Low by the Illinois State Dental Society forced him to sell the bridge patent. His paper describing his invention was refused publication by the Society on the ground that the writer was not "ethical." Instead of this kind of treatment we ought to encourage men with the right spirit.

Carried.

Dr. Sudduth.—I move that the thanks of the Society be tendered Dr. Bonwill for the instruments he has so freely given the Society this evening.

Motion unanimously adopted.

Editorial.

USE AND ABUSE OF DRUG-HABITS.

To the already long list of drugs, the use of which, under proper restrictions, is both beneficial and proper in combating the various ills to which flesh is heir, but whose abuse becomes a curse to humanity, another has recently been added. Scarcely have we learned to properly use antipyrin than the tocsin of alarm must be sounded against its abuse. The recent discovery of its value as a nerve-tonic places it on the list with morphine, chloral, cocaine, etc., so seductive is its gentle soothing influence upon the overstrained nerves.

Its victims are already found, especially among society women, whose nerves, strung up to a high pitch by the overwhelming demands of a winter season of gayety, seize eagerly upon anything that will afford relief from the headaches and other disorders arising from prolonged fatigue and overtried nerves. So pleasing is the effect that it is soon used for every trifling ill feeling, until the patient finds herself unable to live without it, and the fascinating "antipyrin-habit" is formed.

Properly used as a nerve-tonic, its effects are admirable, but abused, the victim becomes even more hopelessly entangled than the morphine or the cocaine victim.

The effects vary with the dose. In large doses it produces complete relaxation with loss of reflex action. In moderate doses, continued, it induces convulsions. As a stimulant its effect is much like that of quinine.

THE FRENCH CONGRESS.

Our contemporary, the Review, seems to be considerably worked up over our editorial in the June number on the coming congress to be held in Paris in September, and takes us to task quite severely, and at the same time so inconsistently, as to make it appear that their whole editorial force had contributed to produce the effusion. Dr. DuBois, editor of L'Odontologie, however, in noticing our editorial, seems well pleased, and says that "it was an excellent article," and that we "commented favorably upon the letters of MM. Brasseur, DuBois, and Kuhn," and so we intended to do. The Review tries to make it appear that we have been dilatory in our action in regard to the congress in that we have not written before on the subject. There are more ways than one of accomplishing things in this world, and we think that if friend Harlan had written less it would have been better for the congress than it is.

As we predicted, the editorial in the May Review has raised a storm of opposition that never would have come to the surface had not the second congress matter been broached. Our support of the French congress has been given through its founders, and our journal has really been the official organ of the congress in America, notwithstanding the statement of the Review to the contrary. In the March issue of The International appeared the first official announcement of the congress in this country, at least so far as we have seen, in the form of a long letter from Dr. DuBois giving the programme and inviting communications. This was an extra large edition, and copies were sent to all the leading dentists in the United States and Canada. The April number of the JOURNAL contained a letter from Dr. Kuhn, and the June number a long letter from the lamented Dr. Brasseur. The two last letters were written with the especial intention of allaying the fears of Americans regarding the efforts of the Review to establish a return congress. It seems strange that the founders of the congress should feel called upon to take steps to be delivered from their friend (?) the Review, but such are the facts in the case.

The editorial in question says that "those dentists who are desirous of the establishment of international dental congresses have no animosity towards the dental section of the medical congress." We do not say that they have either, but we do say that so many congresses will tend to divide the interest, and consequently weaken existing organizations. Those of us who are directly connected with our own American Dental Association realize the fact that it is growing harder and harder each year to get suitable material to make a good programme. And why? Simply because of the division of interest on account of the many anniversary meetings of large proportions which have been held in America the past few years.

There are very few writers in the dental profession, and the

limit of good matter is not hard to reach; therefore, for the well-being of our already existing institutions, we are opposed to the calling of an international dental congress here in 1892. Let us make a success of what meetings we already have on hand before we strike out into new fields. We will not undertake to discuss the erroneous statement of the Review to the effect that "only members of medical societies are admitted to membership in the American Medical Association." The Review need only step outside of its door to find the refutation of this statement. Members of the Chicago Dental Club, a flourishing organization numbering between sixty-five and seventy of the most prominent men in the city, presented their certificates as delegates to the American Medical Association and were fully recognized, and took an active part in the deliberations of the Illinois delegation.

Finally, the place to issue the call for an American Congress is in the United States, and not in France. Let the French Congress adjourn sine die, and if it is decided to call a dental congress in America in connection with the World's Fair in 1892, let it be done by representatives from all sections of the United States, selected by the different State societies, and not by the self-elected delegates who happen to find it convenient to go abroad this fall. The whole idea is un-American, and we are satisfied will receive a just rebuke at the hands of representative American dentists. What, we would query, makes "it incumbent on the members present at Paris to decide whether it is wise or judicious to hold another International Dental Congress?" If it were absolutely necessary to decide this fall, which it is not, as no other scientific bodies have yet taken any action, then the American and Southern Dental Associations should take it up and appoint joint committees to arrange for the whole matter, subject to the approval of their different organizations next vear.

The whole scheme—for by no other name can it be called—is only in keeping with the policy of the *Review* from its inception. Instead of trying to represent the tenor of American thought, it has presumed to dictate to the profession, and its ardent defence of the French Congress has had behind it a long-laid plan to obtain control of a separate dental congress, if one were to be called. But we think the action of the several dental societies that have met since the *Review* unfolded its plan will act somewhat as a check upon its ardor. We predicted that a strong showing of opposition would arise, and so there has, as will be seen from the following resolutions which have been forwarded to us within the past few days.

The Section on Dental and Oral Surgery of the American Medical Association sent a congratulatory telegram to Professor Busch on receiving word that a dental section had been established in the Tenth International Medical Congress, and the general sentiment of all present was undeniably in opposition to calling a separate dental congress.

The Minnesota State Dental Society unanimously passed the following resolutions:

"Resolved, That we extend our hearty congratulations to Professor Busch for having secured the establishment of a dental section in the Tenth International Medical Congress, to be held in Berlin, and pledge it our hearty support.

"It is further resolved, That we deprecate the calling of a separate international dental congress in America, as has been proposed by the Review, on the ground that it will divide the interest and tend to injure the dental section in the Tenth International Medical Congress."

The language is unmistakable, and shows that "especially the Western men," to whom the *Review* appealed, are not responding in the manner desired.

Then the Chicago Dental Club passed strong resolutions, published in the August *Cosmos*, of non-concurrence in the movement, showing that there was anything but harmony in camp over the matter, which would result in the failure of the congress if it were called to meet in Chicago.

The New Jersey State Dental Society, Asbury Park, July 19, while not in favor of passing resolutions pledging support to the Dental Section of the Tenth International Medical Congress, yet, without a dissenting voice, passed the following resolution, taken from the official report of their proceedings, which shows their position as fully as possible on the subject.

The question of appointing delegates to the French Dental Congress being called up, the following gentlemen spoke:

"Dr. Levy.—Mr. President, I do not think that we should recognize the French Congress as an international dental congress; therefore I am opposed to appointing delegates to it.

"Dr. Pinney.—It seems to me, Mr. President, that we should not recognize the Paris Congress as an international congress at all, and, like Dr. Levy, I object to delegates being sent there."

Dr. Palmer offered the following resolution, which was adopted:

"Resolved, that we do not recognize the congress to be held in Paris in September as an international dental congress, and therefore are not in favor of perpetuating it by calling a return congress in America, as proposed by the Review in a recent editorial.

- "Dr. Stockton.—Mr. President, I have noticed in the papers and journals that there are some sixty congresses, already held or to be held, at Paris this year, and I suppose there is no thought that these numerous congresses will be perpetuated and called international congresses hereafter. They will be glad to have you attend, but they have probably no idea whatever that the congress will be perpetuated as an international congress; therefore, as there seems to be no occasion for it, I am opposed to Dr. Palmer's resolution.
- "Dr. Sudduth.—Mr. President, Dr. Stockton seems not to be conversant with the movement that has been made in Chicago towards perpetuating the congress mentioned in the resolution of Dr. Palmer. Dr. Harlan, in an editorial in a recent number of the Review, said very plainly that they proposed to use their utmost endeavors to call a return congress in Chicago, to be held in September, 1892; thereby recognizing the congress to be held in Paris as an international dental congress; and consequently the next congress, proposed to be called at Chicago, will be the Second International Dental Congress.
- "Dr. Palmer.—Another reason why we should be opposed to the scheme is the fact that steps have been taken recently by the New York Chamber of Commerce towards the celebration of a World's Fair in New York in 1892, and it would hardly be fitting to call our congress at Chicago under those circumstances anyway.
- "Dr. James Truman.—I have no particular desire to say anything on this question; but I may give an explanation that may perhaps add a little force to the resolution. Three years ago an informal meeting of gentlemen from various parts of the country was held in New York City, at the time of the meeting of the First District Dental Society of New York, for the purpose of organizing an International Dental Association. In view of the fact that the International Medical Congress was to be held the next year, it was postponed, with the expectation that in 1890 we might call an organization of this kind; and it seems to me that when it is called it should be called by delegations from the different dental associations of the world. I am very glad that the resolution was passed.
- "Dr. Peirce.—Mr. President, I concur in what Dr. Truman has said. My impression is that the Paris Congress is rather a local affair, and not at all international in character; it seems to be part of an exhibition, and that it should be perpetuated, under those circumstances, would seem to be highly improper; and for the reason, also, that in the following year there is to be an international congress at Berlin; and I think it would be unwise for us to divide our forces by having a congress called in this country so near the time of the one to be held in Berlin. I am quite in accord with the resolution.
- "Dr. Waters.—Mr. President, I do not know that I have anything to say on this question, except to endorse what Dr. Truman has said. I was present at the meeting of the First District Society in New York, when the temporary organization which he spoke of was made. There were gentlemen present from various parts of the country,—the South, the West, and the Northwest,—and this question of holding an international dental congress in the United States was thoroughly discussed. Dr. Northrop, of New York, spoke strongly in favor of the organization, and made an able speech. I think the resolution offered by Dr. Palmer is exceedingly appropriate to the occasion, and I heartily second it and move its adoption.

[&]quot;Unanimously adopted."

The Pennsylvania State Dental Society, Cresson Springs, July 31, passed the following resolution:

"WHEREAS, The dental meeting to hold session in Paris, known as the French Congress, is not to be deemed a representative international congress; therefore

"Resolved, That the Pennsylvania State Dental Society does not recognize the French Congress as in any sense an international congress, and that it declines to appoint delegates to it."

Several of the different journals, following our lead, have conained editorials upon the subject. The *Cosmos*, though always conservative, has the following to say:

"We give the prominence of the editorial department to the following correspondence and report because of the importance of the subject discussed, and because, therefore, of the urgent necessity that definite opinions and conclusions shall be reached concerning it, lest the old-time prediction concerning 'a house divided against itself' be verified in the history of the dental profession;"

and publishes the following letter from Dr. Smith, together with the correspondence between the Chicago Dental Society and the Chicago Dental Club:

"CHICAGO, July 9, 1889.

"To the Editor of the Dental Cosmos:

"SIR,—The enclosed correspondence, which explains itself, shows that a very considerable part of the dental profession in Chicago are quite unanimously and strongly opposed to the holding of an international dental congress in this city in 1892. To correct any impression to the contrary which may have been spread abroad, it is desired that the action taken by the Chicago Dental Club be placed before the profession.

"Yours truly,

"C. STODDARD SMITH."

- Dr. A. E. Baldwin, Chicago, August Cosmos, writes from London, on the date of May 30, upon seeing the editorial in the Review, unmasking the plans of its editor, and says,—
- "It really provokes a smile to see the Review enlarge upon the magnanimous waiting for the Washington meeting to have passed before insisting upon an international dental congress, and how it gave warm support as a journal and personally to the meeting at Washington. To one who has been a close reader and even a warm friend of the Review the above statement caused surprise."
- Dr. W. W. Allport, in several letters to us personally, has also expressed the same sentiment, as also have several other prominent Chicago dentists.

Dr. Catching, of the Southern Dental Journal, comes out with a characteristic editorial on the subject as follows:

"We should or would not have written on this subject at all, but for the last sentence in Dr. Harlan's editorial, where he speaks of adjourning the Paris Congress to meet in the United States in 1892. Here comes up the most objectionable feature, and the main one in his mind. We do not oppose a dental congress in Paris during the great exposition, for, as Dr. Harlan says, other societies will hold congresses there. But those congresses do not propose to cut loose from the International Medical Congress and establish themselves as independent congresses; not a bit of it. And as they are not proposing such a thing, they are supported by their respective followers all over the country. and their Paris meetings will be eminently successful. If Dr. Harlan's object was not to perpetuate the Paris Dental Congress as an independent dental congress, thereby attempting to destroy the dental section in the International Medical Congress, which will meet in Berlin in 1890, and in which is established a dental section, we could raise no objection to the Paris meeting. Really, we do not think it is the sense of the getters-up of the Paris Congress that it should be organized and perpetuated as an independent institution. Such a proposition will have the support of but one journal in America, -viz., the Dental Review."

The American Journal of Dental Surgery, Chicago, has a long review of the situation in Chicago, of which the following is an abstract:

"We can assure the French dentists who have been laboring to establish dentistry upon its correct basis (a department in medicine) that a majority of the most advanced dentists in America do not favor the project of establishing a perpetual 'International Dental Congress,' and unless they put their feet down strongly against the project of 'Chicago dental politicians' (a little coterie of self-constituted and would-be leaders),—against the project of adjourning their congress to Chicago, or to any other place,—many of the very best men in this country as well as in England and Germany, who would otherwise be present, will refrain from attending their meeting."

Dr. Jonathan Taft, editor of *The Dental Register* and president of the Dental Section of the Ninth International Medical Congress, also vigorously opposes the calling of a separate dental congress in America, and so on. Upon the whole, we think that our prediction in the June number regarding the opposition that would result from the proposed movement upon the part of the *Review* has been very freely fulfilled, and that it is hardly necessary to "flock to Paris to smother" the matter of calling a second international dental congress, in Chicago, at least.

Foreign Correspondence.

TO THE EDITOR:

Your kind letter just to hand. I, like you, have been overworking somewhat, so much so that I have had to "knock off," and therefore it was not with an unmixed pleasure that I read your invitation to become a foreign correspondent of the International Dental Journal. There are some requests one cannot refuse, and this is one of them. Because, first, I appreciate the compliment, and I trust the distinction of being associated with so important a dental journal will be advantageous; second, I believe that from my position on the Representative Board of the British Dental Association, and from my being thoroughly in touch and communication with the representative men in our profession, I can be of some service to both countries.

The position of the American dentist in England is at present extremely unpleasant, on account of the unprofessional conduct of some holders of American diplomas,—real or assumed. We are making an organized effort by way of protest, of which more anon.

I enclose a specimen of the style of thing that makes "American dentistry" stink in the nostrils of so many good men here.

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Pamphlet free on application, 128, New Bond-street, W. (two doors from Grosvenor-street).

CROWN BRIDGE and BAR, by Dr. G. H. JONES. Like many other branches of study bearing on the health and comfort of humanity, the Dental Art has undergone great improvements, and in his pamphlet Dr. G. H. JONES shows that instead of its being delusive to speak of Painless Dentistry, it is as much an accomplished fact as the swift locomotive, the electric light, or the telephone.

The Crown System is the placing an artificial Crown of Gold or Porcelain upon the remaining portion of a tooth, thereby restoring its original contour and preventing further decay or pain. The bridge and bar facilitates the adjustment of teeth to the various conditions of the mouth without inconvenience.

Her Majesty's Surgeon-Dentist writes: "Dr. G. H. Jones.—My mastication is now perfect and articulation quite distinct. Your teeth are the best, safest, and most life-like, and your system is the perfection of painless dentistry. In recognition of your valuable services rendered to me, you are at liberty to use

my name.—(Signed) S. G. HUTCHINS."

Dr. G. H. JONES, who is a Graduate of the oldest Dental College in the United States, has an American as well as a European and Colonial reputation for successful Dentistry, which is confirmed by a certificate from the most eminent dentist in America, Dr. William H. Atkinson, M.D., D.D.S., of New York City, known as "The Father of American Dentistry," who writes: "Upon proper investigation as to the knowledge and ability of Dr. G. H. Jones as a Dentist in the presence of practical cases in my chair and otherwise, I am satisfied that he is qualified far above the mass of successful practitioners as I know them in America and Europe." The modern improvements render the fitting of teeth a painless and easy operation, which is fully explained in the new pamphlet "Painless and Perfect Dentistry," by Dr. G. H. JONES, F.R.S., Surgeon-Dentist and Doctor of Dental Surgery, 57, Great Russell-street, London, who will forward it by post to any address. Pamphlet and consultation free.

The Hutchins testimonial is said to be genuine, being the production of an old dentist of some repute, who is said to have held office under one of the lord lieutenants of Ireland, but who had all gone to the bad through drink. Her Majesty's surgeon-dentist is Sir Edwin Saunders, and, by appointment, Dr. John Smith, LL.D., in Scotland.

As to the other, can it be genuine? I should like to know.¹
Recorrespondence,—let me have an idea as to when our mails reach
you, and the convenient as well as your latest day for going to press.

Wishing you all success in your new and arduous undertaking,

I am, very faithfully yours,

GEORGE CUNNINGHAM.

MERLIN HALL, CAMBRIDGE, ENG.

¹ Dr. Atkinson denies all knowledge whatsoever of Dr. Jones, and says that the testimonial is a base fabrication.—Ed.

Domestic Correspondence.

TO THE EDITOR:

Every one who has occasion to place a filling in a porcelain tooth has experienced the dissatisfactory working of the diamond drill. The objections are, first, from the length of time consumed, as a diamond drill cannot be hurried; second, from the expense, owing to the frequent breaking of the drill; and third, the unsatisfactory edge produced.

The method I would advocate is as follows: To form a cavity in a central on the mesio-labial surface, first take an ordinary corundum wheel with round edge and of sufficient thickness to give the

required length of cavity,—that is, from as near the cervix to the cutting edge as is desired. Now cut from the mesial surface directly into the tooth until you have the cavity deep enough to show the filling when in place, the desired amount on the labial surface. The labial aspect of the tooth will present the appearance seen in Fig. 1, with a well-formed edge; the lingual as-

Fig. 1.

pect the form shown in Fig. 2, giving a distinct shoulder at a and b. Now, with a copper disk, fairly thin, cut in at a and b in the directions of c and d respectively. In this way the filling may be held

from falling out either upward, downward, or towards the labial surface. To prevent its moving backward, make undercuts, still using the copper disk, just anterior to a and b respectively. The undercut made anterior to a will be entirely on the mesial surface, and is represented at f, Fig. 3. It will be covered by the rubber when in place. That at e may be cut



well in, finishing off the filling in the concavity on the lingual side just below the shoulder, which is beneath the pins. This method of retaining the filling is essentially a system of dovetails. It is

advisable to bend the pin, approximating the cavity, back out of danger of injury by the grinding. After forming the cavity, invest in plaster, for convenience in handling, and fill. Then take out of plaster and finish. A filling put in by this method will be firm in place and present a perfect edge, which latter it is quite impossible to obtain by means of the diamond drill. Of course the edge,



posteriorly, will be irregular in outline, but that is covered by the rubber when the tooth is vulcanized in place.

H. A. KEELY, D.M.D.

Current News.

Dr. Guilford's work on Orthodontia is now in preparation, and will be out in time for the opening of the college year. The book will be amply illustrated, and reach upward of two hundred pages. From examination of advance sheets we can heartily recommend it to students and practitioners.

THE National Association of Dental Faculties voted, at Saratoga, to extend the course of instruction to three years, to take effect at the beginning of the session of 1891-92.

The sixth annual meeting of the Minnesota State Dental Association was held at the Spalding House, Duluth, July 10-12. There was a good attendance and an interesting programme. By way of entertainment the Duluth dentists gave the visitors a boat-ride on the lake, and Dr. Brown gave a reception at his residence.

The officers for the ensuing year are Dr. G. O. I. Brown, Duluth, President; Dr. L. C. Davenport, Moorhead, Vice-President; Dr. C. H. Robinson, Wabasha, Recording Secretary; Dr. M. G. Jenison, Minneapolis, Corresponding Secretary; Dr. H. M. Reid, Minneapolis, Treasurer.

The next annual meeting will be in Minneapolis, commencing the second Wednesday in July, 1890.

Very truly,

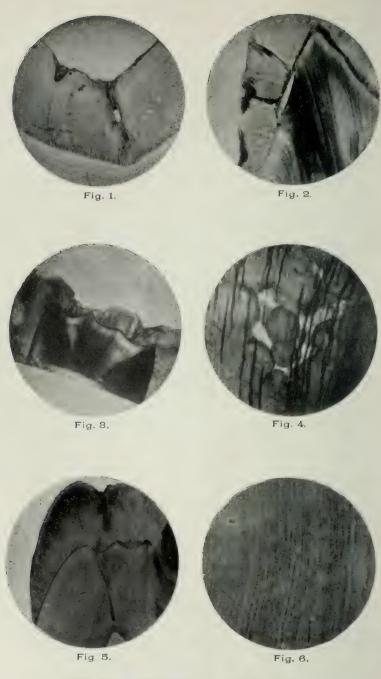
M. G. JENISON.

THE Connecticut Valley Dental Society, the New England Dental Society, and the Connecticut State Dental Society will unite in a union meeting at Springfield, Mass., commencing Wednesday, October 23, and continuing through the 24th and 25th. Prominent members of the profession will read interesting papers, and, as special arrangements will be made for viewing the clinics, they will therefore prove more than usually instructive.

A cordial invitation is extended to members of dental societies. Per order of joint committees.

GEORGE A. MAXFIELD, D.D.S., Secretary.





PITS AND FISSURES OF THE ENAMEL.
R. R. ANDREWS, D.D.S.

THE

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No. 9.

Original Communications.1

PITS AND FISSURES OF THE ENAMEL.2

BY R. R. ANDREWS, D.D.S., CAMBRIDGE, MASS.

THE subject to which I desire to call your attention-"Pits and Fissures of the Enamel"—is one more or less familiar to us. I have been much interested, while studying the development of the teeth, in some of the phases of this form of interruption of the continuity of the enamel cap, and also in the causes which have led to it. Almost all authorities have given these imperfections their attention. Hunter speaks of them as cracks on the hollow parts of the grinding surfaces of the molars, filled with a black substance; and Fox, writing in 1803, describes them as irregularities of the grinding surface of the molars, that lead into a cavity in the centre of the tooth. During the progress of the decay it is under this fissure in the internal part of the crown that we find soonest removed, causing the tooth to appear as if the inside had been scooped out; the enamel being so much harder than the bone, remains, and breaks away only as it loses its support from the bony parts becoming dissolved and removed. The chief predisposition to

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¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Abstract of paper read before the American Section of Dental and Oral Surgery of the American Medical Association, Newport, R. I., June, 1889.

this disease consists in a defective formation of either the enamel or the bony part of the teeth. This original defect in the structure of the teeth, he says, must depend on the want of healthy action in the pulps during the time of the formation of them. It is impossible for him to conjecture what can be the cause of this imperfection, but he remarks that it is very singular and also very certain that the same kind of structure may be observed in the teeth of many individuals in the same family, who in all other respects are quite healthy. He furthermore says that the teeth acquire this disposition to decay from some want of healthy action during their formation. This is proven by common observation that they become decayed in pairs,—that is, those teeth that are formed at the same time, being in a similar state of imperfection, have not the power to resist the causes of disease. He asserts that in some of the teeth the decay is seen to proceed from the interior to the exterior part. In 1835, William Robertson, of Birmingham, England, published a remarkable work entitled "A Practical Treatise on the Human Teeth," showing the cause of their destruction and the means for their preservation. In this work he has probably given more attention to the subject of pits and fissures than any other writer since his time, with the possible exception of Magitot and Wedl. He has examined most attentively these peculiar imperfections at which each of the several teeth are most liable to the beginnings of decay. He says that it never occurs on clean or smooth surfaces, but, on the contrary, the attack is in all instances made at such points as collect and retain the food: in the interstices between the teeth, in pits and fissures in the enamel, or at such other points as from any cause whatever retain the particles until fermentation takes place. He denies in toto Fox's assertion that in some of the teeth decay is seen to proceed from the interior to the exterior part, and says that all decay is the result of chemical action or is caused by a corrosive substance acting upon the outside. He considers the pits and fissures so often found in the enamel, particularly upon the surfaces of the grinding teeth, the principal cause of their destruction. Mr. Robertson claims that it is to this irregularity of structure, so peculiar to the double teeth, that their greater tendency to decay is to be attributed, and the liability of the teeth in different individuals to decay will be in proportion to the form and depth of these fissures. On the other hand, where there is a close union of the sections of enamel upon the surfaces of the teeth, there will be no tendency to decay. The enamel is completed and the secreting membrane removed previously to the teeth appearing

above the gum, so that no after-change can take place in the structure of this substance, nor can it be affected by any of the constitutional diseases or changes to which the human body is subject. Therefore, the durability of the teeth or the predisposition to decay will depend upon the state of the constitution at that early period of life when the enamel is forming. The enamel of the teeth is now universally acknowledged to be an inorganic substance, and can be acted upon only chemically; therefore, when a tooth has appeared above the gum, we can readily ascertain whether it is or is not predisposed to decay by examining the structure of the enamel, and it will be found that the rapidity of the chemical action and the ultimate destruction of the tooth will be in proportion to the form of the fissures that may be found in it, and their capability of retaining more or less extraneous matter.

Kelly, 1843, tells us that decay begins in the body of the tooth, the enamel being nearly entire. In this case it begins in the bone [dentine] of the tooth directly beneath the enamel, and is therefore called internal decay. It is not, however, always produced by internal or constitutional causes. Internal decay is most strongly marked in the molars at all ages. It commences beneath a fissure on the outside of the tooth; a black or bluish spot is at first observed, which increases in proportion to the superficial nature and extent of the disease, till a great part of the outside of the tooth is discolored. In a still greater number of cases the disease takes a direction towards the centre, disorganizes the spongy bone of the tooth, and possibly precludes all hope of the preservation before the enamel even cracks. In a third variety the disease burrows for a longer or shorter time so far within the crown as to give little or no external indication of its true condition. The bicuspids are liable to similar attacks under the grinding surfaces, and with the same results. The upper incisors occasionally begin to decay at a natural though imperfectly-formed concavity directly in the centre of their inner surfaces, but when the enamel is entire, we have reason to believe they never decay at this point. Those who argue that the constitution has but little to do with the teeth suppose that a fissure can always be found over the point where this variety of decay occurs, and hence the only exciting causes are outward and accidental. Allowing this defect to exist, it must be admitted, for it is proof itself that the constitutional powers were originally unequal to the perfect organization of the teeth, and consequently its powers of resisting destructive agents are below the natural standard, which, in the teeth, are at best lower than in

other parts of the system. It is obvious, then, that when any modification of the general health, or any local causés dispose the teeth to decay, it will be seated where they are least protected, on their surfaces in the fissures. Tomes says that molar [and bicuspid] teeth may present to the naked eve all the appearances of a welldeveloped organ, and yet the enamel may be imperfect, and the imperfection may be in such a form as to insure the early loss of the tooth. From the natural depressions which separate the cusps of molar teeth, minute but deep fissures may extend through the enamel to within a short distance of the dentine, and they may become larger as they recede from the surface of the tooth. In most cases which he has examined, they have been filled with cementum, or, rather, with that modification of cementum which constitutes Nasmyth's membrane, and very commonly they become the seat of decay. These minute crevices, the existence of which in many teeth one would not suspect, on ordinary examination, are constantly met with in connection with these forms of defective enamel. Again, he says, in the foremost rank as a predisposing cause of decay, must be placed the deep but minute fissures found upon the masticating surfaces of the molars and bicuspids.

Salter, 1875, writes,-" The defects in the enamel between the cusps of the molar teeth are very common and very fruitful of destructive disease. The fissures are frequently deep, and at the bottom there exists only a confused, ill-developed enamel that is cracked and porous, affording a most incomplete protection for the dentine from external influence. Depressions on the enamel sometimes occur in unusual positions, giving rise to similar results. Perhaps the most common of these occurs at the back of the superior lateral incisor teeth, and is a pretty sure cause of decay in that situation. These are predisposing causes, practically leaving the surface of the dentine open to the attacks of the fluids of the mouth. Where these defects are only superficial, the enamel itself may alone first suffer." Salter shows that the tissue under imperfeetly formed enamel is always more or less faulty in structure, and says that this imperfect calcification of dentine is in itself a predisposing cause of decay; that when the calcification globules are imperfectly fused, decay is rapid, when once attacked. He believes that if the enamel of the teeth remains perfectly sound, they never show any exceptional disposition to decay. Another cause which he considered as tending to predisposed decay is hereditary condition of quality, which is passed from parents to children. This tendency, which runs through some families, is so marked and un-

mistakable, and so independent of any other explainable cause, that it can be supposed to result only from some imperfection in the nature of the teeth, apart from, or superadded to, histological defects. Wedl, in speaking of the cracks or fissures in the enamel, says, "These interruptions of continuity are observed very frequently upon the otherwise healthy, sound teeth of young persons. Upon close inspection by means of a lens, they are found to be much more numerous than one would suspect at first. He says that in order to obtain a definite idea of the appearance of the enamel cap when it presents fissures or carious spots, it is advisable to detach from the dentine the cap of enamel by means of a fifty-per-cent. solution of sulphuric acid. In this way a clear and definite view of the fissures may be obtained. It may readily be shown that when the pigment deposit consequent upon decay is limited to a hardly perceptible dark-brown minute dot upon the masticating surface, it is much more extensive upon the internal or dentinal surface, where it has a roundish or jagged outline. When decay in the groove of a molar tooth is displayed in the form of a very narrow streak containing pigment, the affected portion upon the internal surface of the cap measures a fourth of a millimetre and upward. Wedl speaks also of finding undermining decay in the substance of the enamel; that is, decay that is more extensive in the deeper layers than is apparent externally on the surface, always forming from a pit. The particles of enamel within crumble away and are detached, leaving a cavity, which increases in extent in the deeper layers. I have quite a number of examples of this undermining decay of the enamel in my own collection. Magitot, writing in 1870, speaks thus of congenital imperfection of structure: "The external imperfections, whose forms vary infinitely, consist most commonly of the vices of conformation of the enamel layer; these are dark-colored, irregular grooves on the masticating faces of the molars and bicuspids, fissures which the finest probe penetrates with difficulty. They approach more or less near the dentine, and sometimes actually reach and expose it. All their characteristics resemble closely decay of the first degree. They are exclusively due to intra-follicular disturbances of their dentification. Now these disturbances, when they occur, ought necessarily, owing to the law which governs them, to be produced simultaneously and in the same degree in all the teeth which are at the same moment in the process of dentifi-cation. This is in fact what happens; and here is found the explanation of identical congenital lesions upon homologous teeth, and consequently of decay, which has the same relative position. It is

not surprising, then, to see two molars, for example, or two incisors on opposite sides of the same jaw, presenting the same fissure, the same crevice, the same congenital cavity, and, in consequence, one position, one progress, and one identical form of two parallel cases of decay. Professor G. V. Black states that the occurrence of decay in fissures and pits is dependent principally on the opportunity given for fermentations at these points by the depth of the pits and fissures in the several teeth. This, he says, is modified by the individual predisposition to decay. In the child, this may be inferred after having learned the condition of the teeth of the parents. The enamel, in this position, is very thick and heavy, and the pit or fissure often penetrates it more or less completely, so that the decay apparently does not begin on the outside, but in the depths of the pit, from which it spreads under the strong enamel to a considerable extent, and often penetrates the dentine deeply before giving any sign, especially in children where the dark color is not present as a warning. It is often shown by an ashy-gray color seen through the enamel. This type of decay appears very soon after the eruption of the tooth; the first teeth affected among the permanent teeth are usually the first molars. These cavities occur in about twenty-five per cent. of first molars, or an average of one to every patient who applies for a dental operation." My own experience teaches me that this per cent. is considerably under what it should be.

Dr. Black states that the pits are very often absent in the bicuspids and incisors, but my experience again shows that they are almost as constantly present in the bicuspids as they are in the molars. It seems as though little more need be said on this subject; but there are some characteristics of this form of imperfectly-developed structure that has interested me while studying its appearance under the higher powers of the microscope, and these may add some interest to what has already been said. I allude not only to fissures of the enamel, but also to the character of the dentine immediately within. These interruptions to the perfect formation of the tissues are, I think, largely a result of inherited tendencies, although it must necessarily be difficult to ascertain with certainty whether they may not have been accidentally caused subsequent to birth. are certain to find a tract of imperfectly-developed dentine under the deeper fissure, and this is the original cause for the formation of the fissure. Thus, a deep fissure found in a recently-erupted tooth is a certain sign of a tract of badly-organized and softened dentine within, which may or may not be infected at this time with

micro-organisms. (See Plate, Fig. 3.) The delicate point of an exploring needle demonstrates that the dentine is nearly or quite exposed. A fissure-drill pressed through this, apparently enters normal dentine; a little deeper, and sometimes considerably deeper, drilling reaches a softened and extremely sensitive tract of the poorly-organized tissue. In examining sections of this class of teeth we find this poorly-organized tract to be made up largely of globules of calcified matrix, and the spaces between them are filled with a partially-calcified substance, sometimes called interglobular substance, but which is really "calco-globulin." The globules are seen to be a mass of transparent spherical bodies of various sizes, and they are very numerous under the fissures, so numerous that they enclose jagged spaces called interglobular spaces. (See Plate, Fig. 4.) In a developing tooth calco-globulin is found everywhere on the edge of the calcified dentine between it and the organic pulp. I have often noticed it in globular formation, though it is usually in a smooth laver. The globular formation may have been some pathological interruption in the regular process of development, or it may have represented a primary stage in the formation of the dental tissue. I am not as yet sure which. It is possible that an inherited tendency or any interruption in the normal process of tooth evolution might cause the dentine to assume this primary or imperfected globular structure. The spaces are soft like cartilage, and when the mass is pressed with an excavator or other instrument, it yields, disturbing large numbers of fibrils that are in the mass. This causes considerable pain. The existence of these interglobular spaces can be regarded with certainty as a condition predisposing them to decay, and when these spaces become invaded by infection the decay will necessarily be very rapid. Teeth having these characteristics are usually larger than teeth of the ordinary size. Their faces are rough and irregular with protuberances, rising not only from the grinding faces of the bicuspids and molars, but often from their sides, with deep fissures between them. Their color is usually a muddy white. The palatine surfaces of the incisors and cuspids also have these fissures. They usually decay very rapidly, and in some cases nearly set at defiance the resources of the dentist. Other classes of teeth, having this same interruption, are found to be uncommonly long, and of a bluish appearance; incisors are thin and narrow, and the cuspids much pointed. The bicuspids and molars are small in circumference, and have deep fissures upon their grinding surfaces. They have a soft, chalky texture, and the decay is usually light-colored and rapid. These

imperfections are by no means confined to this class of teeth. In teeth of far better quality fissures, or really cracks and pits in the enamel, are commonly found. They are between the cusps (see Plate, Fig. 1), more often upon the prominences of the cusps (see Plate, Fig. 5), here in the form of pits, and upon the approximal surfaces of the teeth (see Plate, Fig. 2). Some of these probably have their origin from accidental causes. On the prominences of the cusps the pits are often found to lead into what are called undermining caries of the enamel, already spoken of. (See Plate, Fig. 1.) Sometimes the pit is a dark spot which leads into this cavity, and sometimes this pit is light and difficult to see. It can easily be detected in teeth which are examined by a mirror, where light is transmitted through them, when it appears as a gray or brownish spot within the enamel. Although the cavities of decay are within the substance of the enamel, they rapidly enlarge and expose the dentine, when infection follows. Cracks are often found on the approximal surfaces of poorly-organized teeth. They lead into a decayed tract of the dentine which is separated from the enamel by the decay (see Plate, Fig. 2), the dentine is deeply pigmented, in color a yellowish brown. Tubuli everywhere against the decayed portion are found to be full of micro-organisms, gas-bubbles, and granules. These extend in a dark tract nearly to the pulp, looking as tubules do in dried sections when they are full of air. On other sections where pits are found upon the prominences of the cusps, dark-brown tracts, running through the enamel to the dentine, are seen. The tubes near this tract are found discolored and infected. This line of infection runs into the substance of the dentine, in the direction of the tubuli, nearly to the pulp. (See Plate, Fig. 5.) Between it and the pulp, however, there is a lighter layer of tissue, which may be caused either by the resistance of the pulp to the inroads of infection, or may be an uninfected decalcified layer, caused by the acid given off by the infection. Where a section of the recently-infected tooth has not been specially prepared by staining, to show the organisms, the infected tubes have in them minute bubbles of gas, which look like micrococci. Some of the bubbles join together like little rods, having the appearance of bacilli, and may easily be mistaken for such. (See Plate, Fig. 6.) Their origin is probably in the action of an acid on the lime-salts of the dentine. This acid is given off as a waste product by the organisms, and is everywhere present in early-infected dentinal tubes. It has the appearance of what Professor Miller has described as broken pipe-stems in the dentine, but I do not think it is the same thing. It is an easy matter to prove

that the gas-bubbles are not micro-organisms by staining the tissue. I have frequently seen them unstained in sections of carious dentine in which the micro-organisms present were stained a deep red. In all specimens of stained, early-infected dentine, these bubbles of gas are present in large numbers. Cracks are often found to be present on the approximal surfaces of the bicuspids and molars, which lead into the dentine. I have reason to believe these are more numerous than we suppose them to be, and that they are the cause of much of the approximal decay. Where the dentine within its substance is faulty, as in cases I have already mentioned, these cracks may be the source of infection equally with the fissures in the crown. Dr. George S. Allan, of New York City, is the only writer that I now remember who has called special attention to these defects in this location, although Wedl may have mentioned them. Dr. Allan says that calcification, commencing on the prominences of the cusps, gives rise to as many points of calcification as there are cusps. When they meet, from some unknown cause these cusps do not always unite, although seeming to. Among other places, faults of this kind are found on the cervical portion of the enamel, midway between the buccal and palatal faces. They differ from those found on other portions of the tooth in that they resemble more closely an ordinary crack, that might have been caused by mechanical force or desiccation.

I can attest the correctness of Dr. Allan's assertion by recent sections made across this portion of bicuspid teeth. These show crevices or cracks through the enamel, in width sufficient to admit of infection by any of the micro-organisms found in decaying teeth.

THE BONWILL METHOD OF PACKING GOLD FOIL.1

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA.

THE method which I shall endeavor to describe to you is dependent on the use and the proper understanding of an automatic power-mallet delivering blows with great rapidity, and is possible only with an instrument of that character.

By automatic power-mallet I mean a mallet by which the blows are given in regular sequence with uniform rapidity and intensity,

¹ Read at the twenty-first annual meeting of the Pennsylvania State Society, held at Cresson, July 30, 1889.

and by means of power other than manual. Of such instruments we have two which fill the conditions I have prescribed: they are the Electro-magnetic and Engine Mechanical Mallets of Bonwill. The various other forms of engine-mallets which are on the market, so far as my experience with them goes, fail in two qualities essential in a mallet for packing gold by the Bonwill method,—viz., in rapidity and in quality of blow.

The idea which I wish to convey will probably be better understood if we examine for a moment the various stages of development which have taken place in the mallet for packing gold in teeth. We have the simplest expression in the hand-mallet, which has been modified indefinitely in form, size, weight, and material, to suit the fancy of individual operators, until the variety is almost infinite, but they all have the common characteristic of a uniform principle in their method of use, which is, briefly: When the gold has been introduced, and partially adapted or conformed to the cavity-walls, it is condensed, or rendered homogeneous, by holding a suitable instrument-point in contact with the gold, and delivering with the hand-mallet a blow upon the head of the instrument in contact with the gold; the force of the blow is conveyed through the steel shank of the plugging-instrument to the point, and expended upon the gold immediately under the point; the laminæ of foil are forced into close contact, or, technically, are "condensed." The point of the plugging-instrument is then moved to another portion of the gold surface, and the blow with the mallet repeated as before. The operation is continued until the whole mass of gold is introduced and made homogeneous in the same manner.

The tediousness of this method, and the time consumed in large operations, even under the most favorable circumstances, when the malleting was performed by a trained assistant, led to the introduction of that class of hand automatic mallets of which the Snow and Lewis automatic is probably the best and most widely known example. By the use of this mallet was gained extra facility in packing gold, as it combined both plugging-point and mallet in one instrument, thus allowing the operation to be done with the use of but one hand of the operator, and dispensing with the need for an assistant for malleting, with, in many cases, though not in all, a gain in speed.

There was, however, no change in principle, as regards the method of condensing the gold, from that pursued in the use of the hand-mallet,—viz., uniformly dotting the surface with blows from the mallet through the plugger.

The continued demand for a condensing instrument which would lessen the drudgery of gold filling operations, and the time necessary for their performance, brought into existence the electro-magnetic mallet of Bonwill, which involved an entirely new principle,—viz., the use of a power which rendered the instrument perfectly automatic, and increased the rapidity of the blows to an extent before unattained. The instrument was accepted by the profession, and used with the same general idea in packing gold as was customary, and, for that matter, necessary, in the use of all mallets previously used. In fact, Dr. Webb taught that the electrical mallet was to be held in the hand and applied to the gold in a manner similar to that of a pen in making dots on paper,—the principle being, the hand-mallet and plugger made absolutely automatic, and the blows repeated with infinite rapidity.

The engine-mallet of Bonwill not only embraced all that was of value in his electrical-mallet, but developed in his hands a method for the condensation of gold foil, and its adaptation to cavity-walls, which, in my judgment, places this particular mallet far in advance of any dental mallet heretofore produced.

The use of this method demands that the plugger-points, whatever their size, angle, or general form may be, shall have slightly convex faces, with extremely shallow serrations and rounded edges, so that they shall not tear the gold.

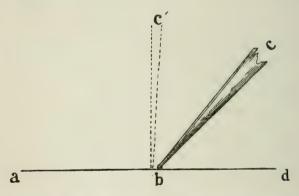
In packing the gold, the surface should be kept slightly concave until the margins of the cavity are well covered, when the central portion can be built out and the contour fully restored.

The majority of the larger gold operations which I have performed for the past three years or more have been done with foil prepared in the following manner: Sheets of No. 4 semi-cohesive "globe" foil are cut in half, and these halves again cut across, making four squares of foil. These are then crimped between foil crimpers, yielding a tape two inches long and one-eighth of an inch wide, and annealed. If the cavity is large and accessible, they are used full length; if small, they are cut to the desired length. One end of the tape is tacked into the cavity, and with the mallet it is woven in and malleted to place by the planishing or burnishing movement of the plugger from side to side, before described. The gold tapes made with the crimpers are used to fill the main body of the cavity, while for the restoration of contour, rolled "globe" foil No. 20 or 30 is used.

The use of foil in the manner described has enabled me to obtain satisfactory results with the least labor, and with a minimum ex-

penditure of time. Dr. Bonwill, I believe, prefers to use exclusively the Abbey foil No. 20, rolled. The choice of foil will no doubt remain a matter of individual taste.

In the use of any hand-mallet the plugger-point is necessarily held at a right angle to the surface of the gold when the blow is delivered upon it, and during the delivery of the blow the point must be held in contact, or pushed against the gold, making it impossible to move or slide the instrument during the action of the blow, with the object of obtaining a lateral pressure on the gold surface. With the automatic power-mallets of Bonwill, the plugger-point should be held lightly in contact with the gold surface, but at an oblique angle, the effect being, when a properly-made point is used, to cause it to slip over the gold surface as the blows are delivered. I can, perhaps, illustrate this point, which is the main factor in the method of packing gold under consideration, better by means of a diagram.



 $A\ d$ represent the gold surface; $b\ c$ the plugger. When an impulsive force is applied at c, with the plugger in a position at a right angle to $a\ d$, the effect of the blow is expended upon the gold immediately beneath the point b, the tendency of the instrument to advance being overcome by the resistance of the gold surface.

With the plugger in an oblique position, an impulsive force applied at c not only effects a condensation of the gold immediately under the point b, but causes it to advance towards a, the result being that the foil is rubbed into position in much the same manner that it would be by a burnisher; with the exception that the force back of the instrument, instead of being continuous and uniform, is the interrupted, impulsive, percussive force of the mallet, and the point, instead of being polished like a burnisher, is slightly serrated.

The method which I have outlined, in my judgment, has several points of excellence, which not only make it worthy of special investigation, but place it far in advance of any method heretofore known for the introduction of gold.

The gold is brought into perfect coaptation with the cavity-walls, and is homogeneously condensed.

The operation can be done in much less time than by any other method that will do it as well.

The gold can be carried safely against and over the frailest walls of enamel, without fracturing them. To quote Dr. Bonwill, "The gold can be carried up the frailest walls, each piece reinforcing itself, and laying a floor up to the margins, giving a security that heavy blows from a mallet cannot. It enables one so to weave the foil by degrees over the edge or periphery of a cavity that there is always a fold of gold under the condensing tool."

The use of the mallet as described renders the homogeneous condensation of the foil a certainty. A practical study of the effect of the Bonwill engine-mallet in packing gold by this method will, I think, demonstrate to any dental practitioner, what has long seemed clear to my mind, that it embraces the best features of the condensing force of the Herbst method, combined with the greater efficiency of the mallet.

I have confined my remarks to a single feature of the use of the mallet, as practised and advanced by Dr. Bonwill, in the hope that the idea may help some of my professional brethren to reduce, in a measure, the physical and mental strain incident to the insertion of extensive gold fillings, and to make such operations a pleasure, instead of drudgery.

Much might yet be said upon the especial features of construction and management of the engine-mallet, but they do not fall within the prescribed limits of the subject of this paper.

DENTAL ASSERTION AND DISCUSSION.

BY JOSEPH HEAD, D.D.S., PHILADELPHIA.

Many eminent members of the profession have remarked and deplored the inaccuracies that so frequently characterize the general atmosphere of dental conventions. And although I wish that some one with more power than I possess had undertaken to discuss this subject, yet its importance demands consideration, as it has to do with the advancement or deterioration of dentistry. I stand before you to-day, not with the idea of stating anything new or startling, but solely for the purpose of showing the superiority of demonstrated scientific fact over mere verbal assertion.

If assertions are properly supported by conclusive proof, then discussion becomes in the highest degree instructive; but statements that may or may not arise from personal prejudice can at best only point in the direction where truth may lie.

In the scientific world, no single man's opinion can be taken as conclusive. The accuracy of all experiments is doubted until the work has been confirmed again and again. For instance, if an investigator declares that he has discovered a new law, he is expected to publish a minute description of all the experiments pertaining to the establishment of that law. These experiments are thoroughly tested by his fellow-scientists, and if the deductions published are found to be correct, he is credited with a discovery. But if the experiments are found to have been erroneous or the deductions incorrect, the would-be discoverer gains a reputation for carelessness only.

Were not deductions compelled to undergo this severe scrutiny, it is quite evident that scientific literature would soon be thoroughly contaminated.

Such caution not only protects against wilful misrepresentation, but it also excludes all mistakes that may arise from inefficiency or heedlessness.

The need for these precautions becomes painfully evident, when we remember a certain animated discussion that has taken place within the last nine months on the subject of root-canal fillings. Gold, gutta-percha, oxychloride of zinc, cotton, and air were re-

¹ Read at the twenty-first annual meeting of the Pennsylvania State Society, held at Cresson, July 30, 1889.

spectively advocated. Each speaker in the debate decried all who differed in opinion from himself, and yet each failed to substantiate his assertions either by experimental or statistical proof.

Discussion carried on in such a loose manner must necessarily prove very confusing to young and inexperienced dentists, who of course attend these meetings for the purpose of receiving enlightenment from their fellow-practitioners; but flooded by a stream of unsupported statement, these bewildered young men find no solid foundation on which to base an opinion. So it happens that instead of being stimulated to careful investigation, they are for the most part terrified by numbers, overawed by superior age and reputation, and expend their valuable energies in shouting with the majority.

How different the result might be, we can readily imagine, if the disputants had been compelled to demonstrate the truth of their assertions by experiments on the extracted tooth, since a clear demonstration would have proved a basis for logical deduction.

If proofs are not required they will probably not be given, as most men, even unconsciously, are prone to describe their own discoveries as just a little better than they are.

Hearsay assertions and statements founded on practice work quite as much for harm as for good, since they merely give additional authority to suppositions that may be intrinsically false.

In order that we may guard ourselves against error, let us insist that each person taking part in a discussion be able to prove his assertions either by experiments, the accuracy of which can be tested, or by statistics which contain the dates and clear descriptions of all the operations mentioned. Had this rule been in operation at the last Dental Convention held by the Odontological Society of Philadelphia, the remarks of certain gentlemen would have been much more instructive. The subject of root-canal fillings was under discussion. One member said that he always measured the size of the apical foramen. Then he ascertained the exact length of the canal. This being accomplished, he placed a piece of gold on the end of his root-plugger, and, carrying it along the canal, filled the foramen, so that no moisture could possibly enter.

This, gentlemen, was an easy assertion to make, but I regret to say that some dentists present doubted his power to fill the roots of molars and bicuspids with the degree of exactness which he claimed. But consider what a death-blow he would have given to all scepticism had he supplemented his statement by continuing as follows: "In proof of my assertion, gentlemen, I bring this

tooth, which has been filled in the following manner. But first, let me say that I have chosen a molar, because, as you know, molars are by far the most difficult of all the teeth to treat, and also the most important, as they constitute by far the largest class. With this slight break, permit me to explain how I filled the roots of this twelfth-year molar. I first placed the tooth in plaster in order that I might not be guided by the length and shape of its roots. Then, by means of the delicacy of my touch, I enlarged the tortuous canals, being especially careful to measure the apical foramen of the anterior buccal root. Lastly, as I have before stated, I packed in my gold so as absolutely to seal the tips of the roots. In proof of this assertion, examine the exposed canals and you will find hard, dense gold completely closing the foramen of all the roots."

Fellow-practitioners, when the speaker referred to neglected to bring forward such simple proof, he lost an opportunity for gaining immortal fame.

But to continue. Another speaker arose, who began by saying that all the dentists in the Eastern States were in the dark ages; that they were at least twenty-five years behind the times; that he agreed with the gentleman who filled roots with gold, but thought it better first to pump the canals full of liquid gutta-percha, afterwards packing in the gold as accurately as possible. In this way he was doubly sure of a tight joint.

Now, some of his colleagues might have replied that in his method the gold occupied the position of a useless mass only, while gutta-percha, weakened by chloroform, was the sole bar to the entrance of septic matter. And, moreover, they might have added that gutta-percha is a leaky canal-filling at best.

But what could the doubters have answered had he risen and spoken as follows: "Gentlemen, here is a molar tooth, the roots of which have first been imbedded in plaster, and then filled according to my method. I have soaked the tooth in red aniline ink for two months. Examine the canals and you will find the foramina free from stain." His proof would have been unanswerable, that is to say, if his experiments should have withstood investigation.

This same gentleman claimed that he saved seventy-five per cent. of all the pulps he capped. Here statistics would have been valuable. Had he shown a record of but two hundred cases where three-fourths of the pulps capped had lived three years, his remarks would have been much more impressive and less open to silent criticism.

Gentlemen, I might go on citing case after case, but it would be uscless. We all appreciate the need for reform. If dentistry is to take her rightful place in the world of science, her sons must make their experiments more carefully and report their deductions with a greater degree of precision. Dentistry should be the most accurate of all the healing sciences, as it is most capable of practical demonstration; because out of the body the teeth, in many instances, can be used for experiment even more efficiently than when they are in situ, since, when the experiment is completed on the extracted tooth, the tooth can be divided into sections, thereby demonstrating the success or failure of the investigator's efforts.

These facts being accepted, it would seem that all dentists claiming to have a remarkable degree of success or skill in performing purely mechanical operations on the teeth should be required to prove their assertions on teeth whose roots have been buried in plaster. When they treat of pain or inflammation, carefully-prepared statistics should be required. These statistics would be extremely valuable, for when the records of three or four dentists pointed to the same conclusion, the proof would be good that the conclusion was correct.

Gentlemen, I do not mean to say that single incidents of practice should not be reported, nor would it be advisable that a dentist should refrain from giving his personal opinion. But it must be clear to all that no great law for the guidance of the profession should be deduced from one or two cases. And when an opinion is offered, let it be as an opinion, and not as an absolute assertion. Office experience, unsustained by statistics or experiments, reminds one of a certain little boy who rushed into his father's study, shouting, "Father, there are three thousand cats in the back yard." "Come," replied his father, "how many cats are there?" "Well, there's a hundred, or, at any rate, our old Tom and another."

To conclude: Brother practitioners, in our dental conventions, let us always remember the celebrated maxim of George Washington,—"In company never tell things which are hard to believe" (especially without substantial proofs).

Reports of Society Meetings.

PENNSYLVANIA STATE DENTAL SOCIETY.

Tuesday, July 30, 1889.—Afternoon Session.

TWENTY-FIRST annual meeting, held at Cresson, Pa., July 30, 1889.

ADDRESS OF THE PRESIDENT, DR. H. C. REGISTER, PHILADELPHIA, PA.

Another period marks the history of time since this association joined in mutual well-doing; and amidst the vicissitudes that have ebbed and flowed for the weal or woe of mankind, a deluge has wasted one of the most beautiful valleys far up in the mountains of our State, not far from this place of meeting. Thousands of people have been swept into eternity under the most appalling circumstances, while to-day the Conemaugh flows peacefully on by the mountain-side with its ripples and shadows in beautiful play. A multitude of people mourn for those who are not, and with commendable spirit have commenced the rebuilding of waste places and broken fortunes.

A calamity like that of Conemaugh touches the vital sympathy of a nation,—comes home to every man as though the sufferer were his neighbor, and his hand goes to his pocket, and from his abundance or out of his poverty he is willing to help as best he may.

What a grand sight to see a nation thus giving, unexampled in the world for generosity, promptitude, and systematic wisdom of distribution, showing as nothing else could the intelligence, quickness, and courage in the permanent strength of the American character! While we are proud of the citizens who have shown themselves so worthy to meet so great a disaster, we should remember specially those who are of our own fraternity. In sore distress and complete loss of strength the helping hand becomes necessary until convalescence is passed. So it is with Johnstown to-day. A city of twenty thousand population has been broken to its foundation. A happy and prosperous community no longer exists, and among its sufferers were ten dentists: one lost his life, and left a destitute

family thrown upon the world, the others lost members of their families, and all lost their property. There has been a circular card issued to the profession asking help for these stranded members of the dental profession and their families. It is a noble opportunity, and I trust the members of this association, one and all, will appreciate the call as a personal solicitation!

To this association, composed as it is of gentlemen representing every part of the State,—the county, village, town, and city,—I deem it a fitting opportunity to speak to you briefly of the latest theory in its application to decay of the teeth, for the reason that after much pruning it continues a vigorous growth and is bearing fruit in the laboratory, the clinic-room, and yielding a rich harvest in the field of practice.

To-day we have presented to the profession one of the most interesting theories ever launched upon the sea of medicine,—viz., the germ theory, or, as some writers put it, *Bacteriopathy*. Microorganisms fill a large territory; they are vegetable parasites, and claim our special attention as dentists.

Cullen says, "There are more false facts than false theories in medicine;" but if we review its history, or that of dentistry, we find much that is false both in theory and in fact. While dentistry is ever progressing, reaching out to grasp the true means leading to better and surer results, the veil of revelation lifts slowly, and we continue to swing backward and forward with pendulum-like regularity in the slow movement upward. Thompson told us, many years ago, disease was the product of cold, and heat was the panacea to all ills. Thompsonian ideas to-day are nil, but its legacy to medicine continues to flavor many prescriptions.

History is ever repeating itself; the same sun rises and sets, the same humanity is ever looking for happiness. In each revolution of time, science makes an impression that finds unchangeable conditions which give us an intimation of the indelible language of Caro.

Astrology, that claimed the greatest minds of earlier ages that the future might be held within the grasp of man, led up to the splendid results of astronomy!

Alchemy, in its control of mighty philosophers, in that the king of metals, gold, might be created from the baser kind, and the elixir of youth be perpetuated forever, brought forth the splendid achievements of chemistry.

And so, through all experience of time, man is striving upward and onward, not in the present as in the olden time to create facts,

but to reveal them. The skeins of life are woven in the universe; we cannot change conditions or things; revelation is for man, and he stands as the most sublime problem of it all, and to know nature is to interpret one's self.

The most universal disease the dentist has to combat is toothdecay. This has been accepted as an external attack upon the tooth, and progressing inward until the organ is lost. To intelligently appreciate the conditions leading up to this universal disease and the means of staying its progress, it is essential to familiarize one's self with the tissues we treat, and to have an understanding of the environment or atmosphere in which the organ resides. A knowledge of the active or passive nature of the parts is necessary, and how the environment is created and the influences leading up to and controlling it and its after-influence upon surrounding tissues. organic conditions begin as simple forms. In life we have the simple segment or cell as the genesis to all animal creation. for instance, the seed: how little do we know, after all investigation and knowledge, of the formative power residing in it. The seed is primitive in comparison with its relations to plant-life; yet what mystery shrouds its creation in continuance of its kind, and still higher and grander in its essential relationship in the problem of all animal life. Metaphysics has not reached it; man must first unravel the affinities of matter and view the structure as it stands before him, one grand, sublime whole.

The teeth we find to commence as simple homogeneous tissue, and to pass into complex heterogeneous tissue. While they are but a small part of the human economy within themselves, the relationship is so intimate and commingled that we cannot appreciate the one without following the current of study into the general circulation of formation, growth, and maintenance of life in general.

The permanent set of teeth are the only organs formed and perfected after birth; they develop from the simple papilla of a jelly-like consistency into the hardest effort of nature. During the development of these organs, the life-forces hold them in hand and seemingly are able to create proper building-material out of any life-sustaining nutrients. From the papillæ we have the pulp. Around its surface are developed a layer of cells called the odonto-blasts, yet being most intimately a part of the pulp. From this odontoblastic layer we have the growth of the dentine, being deposited in successive layers, as though a growth was made and a time of rest taken; this is shown by the incremental lines, and can be tested by soaking a tooth in caustic potash, when the dentine

can be separated in concentric rings. In these spaces the matrix or basis-substance is not so perfectly calcified and particularly so at its termination, where it joins the enamel prisms. The cap or dome fitting the conformations of a tooth-crown have many interglobular spaces, which continue after the tooth is erupted. Throughout the dentine are holes,—you know them as the tubuli; they are very small indeed, requiring about two hundred placed alongside of each other to be as thick as the hair of a man's beard. In the tubuli we have the fibrillæ and the pain experienced in cutting dentine, that you have been in the habit of calling sensitive dentine, which sensation is produced, as I believe, by the bruising of minute nervefibres.

Thus far do we see a tooth is made up of a very complex foundation; the fibrillæ are really prolongations of the odontoblasts, and are distributed throughout the tooth in most profuse richness, giving to the organ that delicate tactile sensibility that exceeds the same sensation in the finger-tips.

In young teeth the fibres continue into the finest ramifications, and pass through the protoplasmic material found in the interglobular spaces, which later in life are terminated by calcification. The termination of the tubuli is mainly in anastomosing with the lateral branches, but many extend into the lacunæ and canaliculi of the cementum. It is, to my mind, the ignoring of this anatomical condition that causes so many unsuccessful devitalized cases of long standing.

In this condition of health we find the teeth externally subjected to retrogression through fermentation.

A ferment is regarded as being composed of organized living beings, either of an animal or vegetable origin.

In studying the organization of the most minute living things, naturalists have at all times been very much puzzled to know if they had to deal with animal or plant life. If we see a horse, a tree, or a shrub, they are readily classified, each to its own order, but with organisms studied under the lens it is not so easy; and it was this uncertainty of things that brought forth the word microbe by the eminent French surgeon, Sedillot, about eleven years ago. Up to this time naturalists—even such a high authority as Heckel—accepted an intermediate kingdom of living things, and called it Protista. It formed the connecting-link in evolution.

The word microbe simply means small living things, but decides nothing as to their being animal or vegetable. Pasteur has accepted the word in his writings. Microbes play a most important part in

nature, their chief office being apparently to reduce complex constituents into simple substances, they being nourished at the expense of organic matter. The study of microbes concerns all mankind; for while many of the effects of these have not been clearly proven, our best authorities are now combining cause and effect so closely that the health of a nation or a continent has been shown largely to hinge upon the proper understanding of these low forms.

In the mouth of animals we have a natural culture-apparatus for a certain variety of micro-organisms. Many of these are not pathogenic, and have no deleterious influence upon the general health, while other varieties are specially designated by the disease they produce. Miller and Black have most satisfactorily shown the action of bacteria upon the teeth by producing caries artificially, and it has also been shown by Davaine that anthrax or splenic fever is directly due to microbes.

Medicine will furnish an easy solution to many problems, when theories become proven facts, and the veil of empiricism is lifted and the medical profession placed upon the very pinnacle of the most humane of sciences.

The reason why animals generally do not lose their teeth is from the absence of a ferment; this is the secret of the whole origin of tooth-decay. Acids may denude the surfaces by decalcification, but not produce decay. Quadrupeds are, in their natural state, free from conditions to form a ferment in the mouth, but man is not so fortunate, and the higher his plane of civilization the more general become the spores of minute organisms, for the simple reason that what comports with his idea of comfort may give origin to these destroying growths. In illustration, I need only refer to the so-called conveniences in drainage and the general methods of heating.

Decay of the teeth, as I have stated, comes from a ferment upon the outside which attacks the lime-salts through affinity; and in these little places upon the teeth the parasitic germs are implanted, take root, as it were, and grow, existing by and through the decomposition of the tooth-substance. They force their way into any broken-down space and growth, producing lactic acid, which takes hold of the lime-salts, and thus a constant increase of plant-growth is possible; and so it proceeds, with but a passive resistance from nature, until the pulp is exposed.

Under these conditions we see at once how necessary it is to make a perfectly tight filling to check the decay, and also how, through thermal changes, sensation is carried by metal fillings to the odontoblastic ganglion and the sensorium. These conditions may be ameliorated by the insolation of all metal fillings by a guttapercha solution and a careful sanitation of the mouth by antiseptics.

The atomization of the mouth and teeth daily in connection with brush and stick, constitute the preventive means. A word to the wise is sufficient, for to know the etiology of a disease enables us to meet and treat it successfully.

DISCUSSION ON DR. JOSEPH HEAD'S PAPER ON "DENTAL ASSERTION AND DISCUSSION."

Dr. E. C. Kirk, Philadelphia.—I have nothing to say regarding the paper except to endorse it. I think a great deal is brought before dental conventions that is open to criticism, as Dr. Head states. Some individuals do not know the truth, while others simply do not have the ability to tell it. Some of the statements made are often a hinderance to our progress. I think the doctor's argument holds water thoroughly, even better than his favorite cosmoline canal-stopping.

Dr. W. E. Magill, Erie.-It strikes me that what we ought to think of is the apparent necessity for such a paper. If we are in our discussions as we are in our practice, open to such criticism, it is well enough for us to inquire where the trouble originates, who is responsible for it, and whether there is any proper cure. From what experience I have had and observation I have made, it lingers upon us as part of the historic past. There was a time in dentistry when there was no beaten track, when every man who investigated did so as an originator,—originator of the principles. There was no man before him who had taken any steps in advance, so you will readily understand how men in the earlier profession, fully occupied in their professional duties, together with the increased sphere of usefulness of the profession, were situated. He had his hands full, and in looking into the subject I think we may ask for charitable criticism. The profession of to-day is different, and it is a question whether they are in need of the same charity; with its enlarged advantages and free investigations, our men should have the time and right to observe, and, I think, should be held to a closer degree of responsibility for their attainments.

It is now very different from what it was twenty-five or thirty years ago, and I think if we fail to recognize the advance of the profession and increase among us, we shall fail to perform our duty. I think Dr. Head has done us a good in mentioning one of our

faults that most of us are guilty of,—awake to our virtues, but not awake to our deficiencies.

Dr. C. V. Kratzer.—There is one paragraph in Dr. Head's paper I can hardly endorse. I think he made a charge against the profession he cannot substantiate; when he charges men of the society with self-importance and self-righteousness in their modes of practice I do not think he does what is entirely proper, or what could be borne out upon investigation. In the society meetings which I attend it has not been my experience that men have advanced their theories and insisted that they are the correct ones. I have noticed a generosity of sentiment that the doctor has not accorded the profession. In our societies there is a change of opinions and theories. and men are given credit by other members for ability and judgment, as they give themselves credit. He mentioned a certain meeting where members got up and advanced theories of filling canals, one with cotton, another with oxyphosphate, and another with gutta-percha, and that each one insisted his was the only proper method of procedure. Now, while this may have been the case in that particular meeting, it is not so in those I have attended. Then he says that members should demonstrate their methods by actual experiments, and that is the only way to establish the correctness of their methods. It is all very well, but I think it is a difficult matter to bring before dentists these practical illustrations. While it can be done to back molar teeth out of the mouth and imbedded in plaster, when the length of the roots can easily be measured, and the extent of the foramen ascertained, it is much more difficult in the mouth. We have that plaster tooth before us and we can turn it into any position we desire, and we can have direct access into the roots. It is far more difficult to do this in the mouth, and still more difficult to bring work done in the mouth before the society.

Dr. Joseph Head, Philadelphia.—My reason for suggesting experiments on teeth in plaster is, it would be well known that if dentists failed to perform their operations on teeth in plaster they could not perform more difficult operations in the mouth.

Dr. L. A. Faught, Philadelphia.—I think Dr. Kratzer misunderstood the object of Dr. Head's paper. I did not understand Dr. Head to say every gentleman advanced his method over all others, but others said they were correct without proving it; for instance, the advocate of gutta-percha says I am always correct, while he cannot always be. Another man says I am always successful with gold, and endeavors to give the impression to the society that he is.

It would seem that the object of Dr. Head's paper is to assist in putting a check on each one rising upon floors of associations and reading papers that assert results, without bringing forth statistical proof of the positions they take. I think if those who have been our leaders would give us statistical proof of their theories, young men and others would be better able to form a definite method of practice. As it is now, there is a great deal of matter given to the profession that is merely supposition, and we do not know who is correct. We have to accept the fact that the gentleman who asserts it believes it. Let us give them statistics or ocular demonstration, not having to prove that our theory is correct, but, if it is wrong, that it may be shown to be an error.

Dr. Joseph Head, Philadelphia.—One explanation more. When a man makes an experiment everybody knows that he is liable to error, and we know that when he makes a mistake he has not performed that experiment correctly, and therefore people, when they err by his experiments, may claim that his theory is unstable. We shall have to trace that error to its commencement by getting other dentists to make the same experiments, thus following out his operations. They will make errors themselves, but it will probably be in other parts of the experiment, and so, by having many men perform the same experiment, each endeavoring to arrive at the truth, the results in total will clearly demonstrate the correctness or instability of the theory in question.

Dr. Joseph R. C. Ward, Philadelphia.—I think Dr. Head's paper very forcibly presents to us, especially those who attend society meetings, what we frequently hear; and that is, members rising and making assertions that their mode of practice is an unqualified success. No matter what that mode may be, they still make their assertions, and I take it that Dr. Head's paper is not to uphold any particular method, but to condemn the practice of members who assert that what they do is always a success.

Now, it is not always the presentation of statistics that proves a method is successful. Two years ago a paper was read in which statistics were given in proof of the assertions, and, in addition, they brought specimens before the society, and yet nearly every member present condemned that practice. I take it that what one practitioner may do successfully another may not do. In the filling of root-canals some practitioners are more successful with gold, others with cotton, some with oxychloride, and others again with gutta-percha. Those who are successful with gold may not be successful with other materials. I think due allowance ought to be

made for the practice that gives us success. If it is only one method, and we are successful with it, I think it should not be overlooked.

Dr. C. V. Kratzer.—Do not misunderstand me. I think it is wrong for any man to say he is successful in all cases, and I endorse that part of the paper which says "idle assertions should not be made." I merely want to refer to the impracticability of giving such proof at all times.

Dr. Joseph Head, Philadelphia.—I meant to say that whenever a person gives his testimony it should be as an opinion; but when a person states a fact, he should be compelled to prove it, either by experiment or by statistics. Let him give statistics to go on record. Other gentlemen will give similar evidence, and if their statistics agree, the conclusion will be that the statement is correct.

Subject passed.

DISCUSSION ON DR. KIRK'S PAPER ON "THE BONWILL METHOD OF PACKING GOLD FOIL."

Dr. W. E. Magill, Erie.—I would like to ask if, in packing gold over frail walls, you find an advantage in this method. As it first strikes me, it seems that in the power being applied from the centre to the surface the blow strikes at its weakest point. It should be from the outside to the centre instead of otherwise, but you have probably tested it, and do you find it the safer way of packing against frail walls?

Dr. Edward C. Kirk, Philadelphia.—In filling any cavity the gold should be in as close contact as possible. As I understand filling a cavity, whether the walls are frail or not, the gold should be packed against those walls. I do not think it is possible to get a perfect joint except in this way. In the use of the mallet in conjunction with the convex points, the instrument may at times come in contact with the enamel walls, but the rounded surface will follow over, and you will burnish or planish the gold into place in a uniform manner, and pack it up against the cavity-walls instead of chipping down on it.

Dr. W. E. Magill, Erie.—The success of this would depend very much on the nicety of manipulation, so that you do not bring undue pressure upon the edge. We always supposed that the success was in a vertical blow passing around the margin. While we condensed vertically we secured with the least amount of pressure against the walls of the cavity a tight joint. In packing by central force and

pressing outward we feel that we should be taking additional risk, and now, as I say, I presume your idea is that as you manipulate outward with this sliding movement you must be very steady of hand and clear of eye, and so adjust your force to the weakness of that wall that you shall not break it?

Dr. Edward C. Kirk, Philadelphia.—To illustrate better the point I am bringing out, we will say the surface of the gold is extending out the left side of the cavity-wall. The operation will be the same as if I take my thumb and with a piece of tape of gold simply wipe it in over to one side, and then back again. I shall be satisfied if the gentlemen will be sufficiently interested in what I have said here to try for themselves the method I have shown, -using the rubbing-in movement with the Bonwill mallet. I had the Bonwill mallet six months in my office before this inspiration came to me. After thinking I had made a discovery I went around to Dr. Bonwill's office and told him about it. He laughed, and put in my hands a dozen points, proving that he had used it himself before. These points had not been made for sale, for the reason, he said, that the profession was so wedded to the dotting action that they would not change. It condenses the foil much better than any method I have seen. It is a percussive force.

Dr. C. S. Beck, Wilkesbarre.-I have no experience whatever with the mechanical mallet, but I claim to have a great deal of experience with the electric mallet. I have used it ever since it came out. I think Dr. Webb used the same method that Dr. Kirk mentions as originated by Dr. Bonwill. Dr. Webb always ran his instrument across the filling, but perhaps not to the extent that Dr. Kirk describes it. It looked like the dotting of a pin, and he always preferred a flat instrument and not a convex one. I can readily understand Dr. Kirk,-how he creeps along with the convex instrument; as he advances, the convexity of the instrument catches the gold and keeps it down. I have not tried that method, but I will do so. The next time I go to Philadelphia I shall take the liberty of calling on Dr. Kirk to see the instrument work. If it were flat it would sort of turn the gold up, but instead of this, being convex, it turns it down and against the walls. I think a great many failures are due to the manner in which we strike the blow. With the electric mallet you can get just as delicate a blow as you want. You do not want a sledge-hammer. If too much, instead of condensing, you chip it. I want to thank Dr. Kirk very much for the idea of convexity in the points.

Dr. Edward C. Kirk, Philadelphia.—I want to say here regarding

the paper on this subject, published in the Cosmos and read before the First District Society,—"American System against Herbst,"—that no man would take sides against it. I have had so much comfort in it that I said I would come before the society and give them the benefits of my experience.

Dr. W. B. Miller, Altoona.—I cannot conceive how any one can manipulate gold with anything better than the electric mallet. I have seen the Bonwill mallet in use. My experience is that with the Bonwill there is too much vibration. With the electric you have perfect control over the instrument, and no weight. I do not altogether agree with Dr. Kirk as to the method of Dr. Webb in packing gold. It is not as a pin, but simply is a "dotting over." There is great room for improvement in the shapes of instruments for the mallet. Only two or three are of any value to me. I would like to ask Dr. Kirk if he cannot manipulate gold as well with the electric as with the Bonwill mechanical.

Dr. Edward C. Kirk, Philadelphia.—The instrument I have now I did not have when I tried the electric. I think I can work much faster with the Bonwill mechanical mallet. In regard to Dr. Webb's method, I think Dr. Miller is correct. I think he used an approximation of this, and Dr. Bonwill was then working it out. Webb used this dotting action of the pin with the mallet, and as soon as he got the idea of wiping he commenced to use it, but I do not think he arrived at the same perfection.

Dr. H. E. Roberts, Philadelphia.—Does not Dr. Bonwill's method resemble Dr. Fillebrown's way of pushing gold into position? He does not get a blow at all, but with the same rounded instruments packs the gold into position.

Dr. J. A. Libbey.—Last year, in Chicago, Dr. Stevens showed me his filling instruments, which were of very peculiar construction. They were convex-shaped instruments. He took these instruments and had them serrated down the side also. In the method of manipulation touched upon here, he said it was a great improvement. Now, Mr. President, Dr. Miller says there is no instrument in his hands that he can use with the fine, delicate manipulation he can the electric mallet. In my hands there is nothing I can use with the same delicate touch as the hand-mallet. I have tried to use the electric mallet, and with me it is a failure. I have tried nearly every other method except the mechanical. This all illustrates the fact that whatever instrument or method we thoroughly educate ourselves in, this will be the most successful in our hands, each variety tending to the same good result,—that of the successful

manipulation of gold. A word further in this connection. I believe the doctor said he used semi-cohesive gold in starting. My experience is that I cannot make a successful operation with either cohesive or semi-cohesive gold on approximal surfaces. I believe I have had some satisfactory results in that way, but I have had a great deal more success with soft gold at the cervical border than with cohesive. I have concluded that I cannot fill approximal cases as well with semi-cohesive as with soft.

Dr. C. S. Beck, Wilkesbarre.—I think that we as dentists get hold of that sliding backward-and-forward movement by thinking of Dr. Herbst. I got a set of points, and went home and tried several fillings with his method. Some I was satisfied with. The other day I saw two that I had inserted by the Herbst method, and was very well satisfied with them. I thought, however, that the rotary motion took up more time than if I used the mallet, and did not do the work as well as the latter instrument. Dr. Webb always went from the centre to the periphery, and was always careful to take the gold over the edge of the cavity. I am much pleased with this method, and I think it is good.

Dr. W. B. Miller, Altoona.—I think it would be well to suggest to the dental manufacturers to make points after the manner you mention.

Dr. Edward C. Kirk, Philadelphia.—The Whites make a set of points such as I use. They are half Dr. Bonwill's and half my own. The reason I should not use them in the same way with the electric as with the mechanical mallet is that the blows are different. I want it distinctly understood that I lay no claims to originality. It is simply a method based upon Bonwill's. He devised it, and is entitled to full credit.

Subject passed.

(To be continued.)

NEW JERSEY STATE DENTAL SOCIETY.

THE nineteenth annual session of the New Jersey State Dental Society was held at Asbury Park, July 17, 18, and 19, 1889.

Thursday, July 18.—Evening Session.

Illustrated lecture by Dr. W. Xavier Sudduth, Philadelphia, on "The Individuality of the Biological Cell."

Dr. Sudduth.—The subject announced for me this evening is the "Similarity in Development of Hair and Teeth," yet I ask the privilege of referring to it only incidentally, and dwelling upon the individuality of the cellular structures that constitute all multicellular organisms, whether vegetable or animal. I base the assertion that the metazoa (many-celled structures) are an aggregation of protozoa (or single-celled organisms) upon three distinct phenomena, which I think I can clearly demonstrate to you this evening.

The first is the direct evidence to be drawn from cellular mor-

phology.

The second is the similarity of the cells that constitute the formative layer of the rete Malpighii, to which latter I shall in the main confine my remarks this evening, and yet the dissimilarity of the resulting products that are developed from this layer, such as hair, sebaceous and sudoriferous glands, nails, horns, hoofs, scales, and the enamel covering of teeth, thus proving my third proposition, which is that each and every individual structure (cell) that forms a part of the formative layer has stored up in it an hereditary tendency which will eventually, when under the proper conditions, result in the tissue, the prototype of which must be contained in the formative element or cell.

But before proceeding with the lecture, it may be well to tell you how the photo-micrographs, with which the lecture will be illustrated, are made. In the first place, we prepare the tissues by cutting them in slices with a microtome, an instrument specially constructed for cutting very thin sections. The sections are then stained and mounted on glass slides, then with the aid of a microscope and camera they are very much magnified, and their image thrown on a negative plate. In this process the only work that is artificial, as you may say, is the hardening and the staining process. The idea is to get them in a condition in which they may be preserved and studied with as little change as possible. It is, however, impossible to prepare and cut them without some change or shrinkage. But we have brought our methods of hardening tissues to such a state of perfection latterly that there is very little noticeable difference between the tissues in their original condition and after they have been hardened. I will show you some pictures in which the hardening process has not been used; and there we virtually have the shadow of the living tissue. So far as accuracy is concerned, there is no method for demonstration to compare with that of the photo-micrograph. By this means we put upon the screen a representation of the original tissue without the intervention of man's hands, and as nearly perfect as it is possible to get it. You can see the shadow of the tissue and make your own diagnosis, and draw your own conclusions from what is on the screen. If I demonstrate to you with the microscope I cannot look at the specimen at the same time you are looking, and cannot see exactly as you see. The focal distance of different persons' eyes varies, and it is almost impossible for two persons to look at the same object and see in it the same aspect. But with photo-micrographs thrown on the screen you have the most accurate representation of tissue that can be made, in my judgment.

It is almost impossible to convey to the minds of those who are not conversant with histological work any idea of the innumerable numbers of infinitely small elements that constitute the body. think I shall be able to show you that animal tissue is made up of innumerable units, which units bear the same relation to the animal system as the bricks in a house do to the whole structure; and that each individual element is a separate entity, and all are united by a cement-substance. We shall see that the human organism in all its complexity is simply an aggregation of individual organisms, each having a separate function to perform and an individuality to follow out. I will use the terms unicellular organisms and multicellular organisms, or the protozoa and the metazoa. The protozoa are unicellular organisms,—that is, bodies made up of individual units,-single bricks; the metazoa are multicellular organisms, -that is, bodies made up of many units, or many bricks united so as to form a wall.

It has been said that this line of study is not up to the latest date, that these terms are old and obsolete; but these terms are in general use, and we understand what they mean. We want to use common terms as much as possible, and not introduce new-fangled ideas and words that are not understood; we want a nomenclature of common language that we can use intelligibly. The text-books, including the latest one by Binnet, use the terms unicellular and multicellular organisms; therefore these terms are not obsolete in our text-books; they are used in English, French, German, and Italian books, and have the same interpretation in all these languages.

We have a class of organisms that are very low in the scale of life, at the very foot of the ladder, having no power of motion even, and which it is impossible to determine positively whether they belong to the animal or the vegetable kingdom. These are the micro-organisms that have given us such a wide field for study within the last ten years, and which study has done so much to explain the questions and solve the problems that have so long puzzled scientific men.

These unicellular bodies possess many of the qualities exhibited by higher forms of life. Binnet, a Frenchman, has recently written a book upon the psychic life of micro-organisms, in which he says that all or nearly all the phenomena exhibited by the metazoa may be distinguished in the protozoa. It is a most interesting little book, and I would advise all who have any interest in these occult subjects to obtain it. My own observation, to a certain extent, bears out many of the statements made by M. Binnet. Micro-organisms are living structures, possessed of the property of assimilation and multiplication, many cells arising by division of the original mass (fission), or by the throwing off of spores (sporulation), which ultimately reproduce forms of life like unto the parent cell, and functional activity, as seen in the production of ptomaines. some of the higher forms sexual propensities are even described, and certain actions are interpreted as being veritable copulations. My own studies have not, however, been sufficiently extensive in this line for me to approve or gainsay the truth of the assertion. Reasoning from the known manifestation of sexual powers in animals.—only a little higher in the scale of being than micro-organisms,-we are fully prepared however, to accept the statement.

[Dr. Sudduth here showed on the screen a number of pictures representing micro-organisms,—the bacillus of tuberculosis, anthrax, swine-plague; blood-corpuscles and the tissues of the lower animals, and the human fœtus in various stages of embryonic life, all of which he explained as they were shown. A part of Dr. Sudduth's explanation is as follows]:

This is a photograph of blood as it was drawn on the slide and photographed, without staining or hardening at all. These individual elements or red blood-cells are entirely separate. They float freely in the liquor sanguinis of the blood. In form they are double concave disks. They are not united together. The round object in the centre of the field represents a white blood-corpuscle surrounded by red blood-corpuscles on the sides. The peculiarity of the white blood-corpuscle is that it has the power of locomotion; it can travel from one portion of the field to another. It has been called the human amæba. It consists of a mass of protoplasm which has the power of locomotion, and the power of digesting the elements of the The red blood-corpuscles have not the power of locomotion in the same degree that the white have, but they possess it slightly. I have watched these white blood-corpuscles for hours at They throw out processes like legs (pseudopædia), little projections of protoplasm extending out from one side, and by

means of these the corpuscle pulls itself along. These cells pass out through the interstices of the cellular wall,-through the mortar between the bricks. I want to call attention to the fact that we have individual elements which float freely in the liquor sanguinis, but which, when they pass out from the capillary vessels, become in a manner tissue-builders. It is true that tissue is developed, in a majority of cases, where there are few such cells, but the white blood-corpuscles are always more or less a factor in the development of tissue. It is easy to see that these are individual elements, that they stand in the same relative position to the structure as the bricks in the pile do to the completed building. As we put bricks in a house they become part of the house. The body is made up of many thousands of pieces, as is the house. Then we would say that we have individual units, and that these individual units possess in themselves certain characteristics; that they have the power of motion in some instances; that they have the power of performing function, of digesting tissue, and feeding themselves.

Here we have a section of the mucous membrane of the mouth. Here we have the individual elements, the units in the body. These tissues may be represented by the walls of a house. Each one of these cells that you see here represents an individual element, or brick. The dark lines are the counterpart of the mortar that holds each brick to its fellow. The nucleus, which shows here as a dark spot, is the vital portion of the cell; in these nuclei lies the formative action of the tissue, which is simply an aggregation of individual structures. The metazoa, or multicellular organisms, are made up of the protozoa, or unicellular organisms.

Here is a photograph of cartilage. Here we have the wall again, with its individual bricks. Each one of these individual elements represents the stones or bricks in the walls of the house. This cartilage is semi-elastic tissue, such as that which you find in fishbones and in the body of the ear. I next also show you hyaline cartilage, which consists of innumerable numbers of individual elements, lying in an undifferentiated basement substance. As you pass from this central portion towards the line of developing bone, you see the transformation of these tissues. Notice how, from being indiscriminately distributed, they gradually assume a perpendicular arrangement into columns, lines, or rows. There is order in all things. Tissues follow out certain well-formulated hereditary tendencies.

The next slide shows Meckel's cartilage. You see the individual elements as they go to make up this large mass. The forming bone

is represented on the side, consisting of layers or lamellæ, upon the surface of which are seen the osteoblasts and in their walls the bone-cells. The osteoblasts are the bone-builders which build this osseous structure. Here you see these cells in the process of being built into the wall. As the bone is developed the cells occupy the spaces in the bone, as bone-cells, or the living part of the bone.

Here you have a cross section of a blood-vessel, representing an Haversian canal, and surrounding it are the osteoblasts.

This is the same, magnified very much higher. The osteoblasts are nuclear structures almost entirely, and are not typical cells, as has been generally conceded,—but I will speak of this more at length at some future time.

The next slide taken from the anterior portion of the spinal-cord, gives us another tissue, and which belongs to the nervous system. Here we have a composite organism, one that is made up of two kinds of tissue,—epithelial tissue and connective tissue, or cement-substance, composed of fibrous tissue. The epithelial cells have processes running off from them. This slide was stained with Bismarck brown, which is one of the best stains we can use for photographing.

Not all these cells have processes alike, for here we have cells without any and some with one or two processes, and some that have many processes. Here is shown the central nucleus, which differs decidedly from the basis substance.

Our next slide is an excellent preparation, made by Dr. Andrews, and consists of a highly-magnified photo-micrograph of developing dentine, showing the odontoblastic layer upon the surface where the cells have been mechanically separated. We find that when we tear the tissue apart the odontoblasts hold to the dentine more or less firmly by their processes, which extend into the dentine on one side. You can see quite plainly that they are individual elements.

Our next slide consists of a section of the skin. At the deepest portion we see the cells developing. The vascular supply is found beneath in the true skin; no blood-vessels having ever been demonstrated in the epithelium.

Here we have the infant layer shown upon the screen, very highly magnified. A cell has a nodal point, with the protoplasmic material surrounding it. It is proven that the vital portion of the cell is found in this central point. In embryonic structures these lie in what are called naked cells. These central nodal points lie in an undifferentiated bed of protoplasm. Protoplasm has the power

of transmitting sensation and of performing function. In certain animals it serves the purpose of a nervous system; and this property of protoplasm accounts for the sensation in the dentine. This is brought out very plainly in a late work of Binnet's on micro-organisms. I hold that it is not necessary that we have differentiated nerve-fibre in order that sensation may be transmitted from one point to another. I have, however, been criticised on that point.

The development of these animal cells is by fission. It has been ascertained that these granular particles (nucleoli) become polarized. and arrange themselves in opposite ends of the cells; and when these granular particles collect in either end of the cell then we have a constriction of the cell; then the cell divides into two, and it is divided again and again in geometrical progression. There are other ways by which tissues grow, and one is by sporulation, as is shown in the next slide, the bacillus of swine-plague (hog-cholera). We have here the central portion of the cell divided into two spores. The protoplasm is thin, and transparent between these two points. They are like two beads joined together. I have seen, and caused by special methods of culture, anthrax bacilli to develop into long chains, and then form spores. This is another triumph of the investigator. He can at will produce this division of tissues. If you give the anthrax bacillus its natural food it grows very rapidly indeed. We are able to see the different changes in the tissues. Then again, we have the development of lower forms of life by a similar process of those of the tissues of the body. The amæba, by splitting off a portion of itself, develops another amæba. In the development of the tissues that go to make up the body, the original impulse of the development must come from the nucleus itself.

Now, studies have been made upon the Stentor corrulous, an infusory which represents a very low form of life, but which is of sufficient size, so that by placing it under a microscope and then using extreme care you are able to divide it into different parts. If we simply cut off a portion of the protoplasm, then we find that the severed portion will live for six or eight or ten hours only; but if we divide it in such a way as that some of the nuclear portion goes with the protoplasm, it will produce another infusorium with all its essential parts. It has the power of motion after division for a limited period of time, but has not the power of producing one like itself without some of this nuclear portion. The real life-giving force does not reside in protoplasm as a mass, but in

the central nuclear portion. Protoplasm has the power of digesting tissue, but it has not the power of instigating propagation or reproduction; that power lies in the nodal point or nucleus, in the central portion of the cell.

It has also been found, in these protoplasmic masses, which have no outside limiting wall or cell-wall, that the protoplasm itself will throw out little feelers, feeling for a place to attach themselves and pull the body over; or in searching for food, as some of the higher amœba do search for food. We have that action which is a living action in this material, but this one material only acts by instigation of the central point. The nodal point or nucleus is the point from which the impulse springs.

We have shown pretty clearly the character of isolated cells; now we desire to call your attention to cells in situ, and by special methods of technic demonstrate that many cells of the body do not form a solid mass. This is shown by the next slide, which is taken from the mesentery and is stained with nitrate of silver. These dark lines mark a division between each and every cell. Each one of these points represents an individual cell, with its nucleus in the central portion. They form a single layer of cells, and when so united are called endothelium; they form the covering of all closed cavities and the lining membrane of blood-vessels. It is between these cells, in these dark lines, that we have an egress for the white blood-corpuscle.

We have very fully considered the morphology of cells; let us now turn our attention to the evidence which may be drawn from the different phases of development and see if we can throw any light upon their character from this point of study.

For our next slide we have the ovum or egg in its initial development. It consists of a single cell, made up of a granular layer surrounding the vitellus, which corresponds to the cell-body and containing a nodal point which compares with the nucleus of tissuecells. When the ovum is ripe the tissue over its surface breaks open and allows it to escape. All ova have more or less the same morphological appearance. From this initial cell we have the development of all the tissues. We will trace the hereditary tendency that is pent up in these individual elements.

The next slide shows us a drawing of a human ovum. Heretofore all our studies in the development of ova have been confined to those of animals lower than man. Within the last few years we have been able to make studies of human ova; and what you see is a drawing made by Nagel, representing his observations upon the human ova at a clinic in Berlin. Taking the warm ovum, after it had been obtained in the operation of laparotomy, he found that the division and the changes which occur in the human ova are almost identical with those that occur in many of the lower animals; and this fact has brought us to a point decidedly in advance of our former knowledge regarding division of tissues in the human system.

The next slide represents the ripe ovum which is cast forth. He found that in the central portion polar globules were formed similarly to those in rabbits and cats. Division begins in the nodal spot; and the subsequent changes of the body surrounding are the result of the governing force that comes from this portion.

The next slide is also a drawing. It shows how these cells divide. Here you see division of the nucleus into two parts. The process goes on until there is a separation of the entire ovum. Here are spermatozoa. As fecundation progresses we have a new structure, the result of the union of these two elements. If you say that the ovum is passive, and that the reproduction probably comes from the spermatozoa, I will take no exception to that. But we have in this ovum and spermatozoa the potentiality of the future product.

In the ovum and spermatozoa must lie the hereditary tendencies which will by future growth give us the several organs and tissues of the body, for they do not form until later on, but in their development precede function, so that they cannot be said to arise as a result of function. I think that I can demonstrate to you that by division of the original cell we have a division of function. The original cell divides, as here shown, first into two, then into four, then into eight, sixteen, and thirty-two, and so on, until we have a sufficient number of individual elements, or kinds of cells, to represent the different functions of the entire system.

The next slide shows us how by division and differentiation we have the development of the three layers,—epiblast, mesoblast, and the hypoblast. From these three layers the different tissues of the body are developed.

We never have any interchange between the epithelial elements and the mesoblastic elements. They remain throughout the life of the individual entirely different. Why it is that by differentiation from one original cell we have these different layers formed, which have entirely different functions, I cannot tell you, but such is the case.

The next is a photograph of the epiblast as seen under the mi-

croscope with a high power. We have here the individual elements,—the bricks in the wall. The life of the individual lies in these nodal points, and from these points go out the active functionizing powers of the tissues. They are shown here lying in an undifferentiated basement substance. As we follow these out in later stages we see that this part, the inner layer, becomes thickened; these nodal points develop around themselves a certain amount of formed material.

If we take any of these cells and transplant them on a living tissue they will grow. Dr. Garretson for several years experimented in that direction with cancer. He first took scrapings from the arms of students, until they grew tired of it. He finally resorted to curryings from horses, and transplanted the epithelial cells so obtained to raw surfaces, and they grew. I saw in clinics at Vienna, especially in the skin clinics, the transplantation of small pieces, which made a new growth and adapted themselves to the new tissue where they were placed, showing that scrapings of the epithelial tissue from the surface may be revivified if they contain this central or nodal point. Unless the portion cut off contains nuclei, it will not grow, but, as has been shown by experiments on lower forms of life, it may live eight or ten hours.

We know that from the skin are developed hair, sweat-glands, fat-glands, the nails, horns and hoofs, so-called dermal appendages. These structures are developed by proliferation of the cells of the infant layer of the epiblast.

Here, on the screen, we have the first stage in the development of a hair. Here is the Malpighian layer. At this point there was a rapid development of cells which caused a thickening of the deepest layer of the epiblast; and by that thickening there resulted a depression of the layer into the tissue beneath and the formation of a bud. As this goes on you will find that the next stage shows that process dipping down farther into the tissue. The most rapid development of cells is at the deepest point, while the overlying cells remain apparently the same, except that the skin becomes a little thicker as age advances. Thus it appears that the glands, the hair, and the enamel organ of the teeth are developed by proliferation of one or two cells that form solid growths into the tissue. The differentiation lies in the cell itself. We have no power to see whether a particular cell will develop a hair, a sweat-gland, a fat-gland, or the enamel organ of a tooth. In the nodal point lies the history or record of what it is going to be.

Here we have that bud dipping down farther into the tissue,

and a condensation all around the side, and forming the connective tissue-envelope. The bud dips into the tissue a certain distance, and then these secondary changes occur. The hairs of the face are much deeper rooted than the hairs of the head. The feelers of the cat dip away into the tissue, while the other hairs of the cat only go slightly under the surface. We have no means of knowing why this is. That individuality also lies in the nucleus. By this division and elaboration we have a differentiation and division of function as the result of hereditary tendency.

The next step in development is the formation of the papilla. This papilla carries with it a vascular supply that will make the root of the hair.

Here we have condensation of the papilla in the formation of the root of the hair. Here you see the sebaceous gland forming. Here we have a hair developed, but much less highly magnified. This is taken from a child three days old. The first hairs developed are called lunago hairs, and are only temporary, being shed and replaced by more permanent hairs. A bud is thrown off from the base of the first hair, which is crowded out, and a new hair takes its place. That is exactly analogous with the development of the permanent tooth from a bud that comes off from the side of the temporary tooth. The development of a hair seems to be quite a simple process. We are not prepared to say that there is no design in regard to the placing of hairs; although they dip into the tissue apparently without any particular order of arrangement. In certain animals, however, as in the cat, certain hairs are used as feelers. There is apparently a place or point where these hairs are to go down; but it is not so plainly marked as with the teeth. In the shark the spines of the skin are differentiated into its teeth. The mucous membrane of the mouth is identical with the skin on the outside. In the development of human teeth, and the teeth of all the carnivora, we find design as to location. Take a cross section of the jaw of a pig; here you have the grooves, so-called, dipping into either side of the jaw; on the other side of the cross section there is the epithelial layer which constitutes the skin. In the embryo the cells in both are morphologically identical.

This is a longitudinal section, showing the outline where the teeth are to be developed. This is called the band which may be said to be common to all the temporary teeth. Hairs, however, come directly from the surface without the interposition of any point or band which in the case of the teeth determines their location. But for that we should have teeth growing all over the jaws, inside

and outside and everywhere. This is broken up into the outer and the inner lamella. From the inner lamella we have put off the cord, that corresponds with the bud in the development of the hair. There is an epithelial bud dipping down into the tissue. The differentiation is always at the deepest point, commencing in a single cell which, by multiplication, causes at first a slight thickening of the rete Malpighii. As the bud goes down you see a constriction of the neck, and the cord becomes bulbous.

Here we have a cross section of another jaw, showing the development of the jaw; and here the developing teeth on either side, and the first development of bone. Here is the first indication of the development of the connective-tissue periosteum surrounding the jaw. Here you see the breaking away of the mother layer, and there the papilla is beginning to take a conical form. There is a portion of the stellate reticulum of the enamel organ. Here the alveolus is seen developing on the side; there the papilla is assuming the form of the future tooth; here the cord for the development of the permanent tooth, just as the cord was in the development of the lunago hair, or for the formation of the permanent hair.

I have tried, although imperfectly, I know, in the time allotted. to show how from a common starting-point in one cell, by division, the potentiality stored up in the mother cell was divided into the several cells, which afterwards served as the nodal points from which went out the impulse that resulted in the development of the several organs and parts of the body. Organization in the embryo certainly precedes function, for we find the several parts completed before function begins. We cannot, however, doubt that environment largely controls the formation and selection of organs, and we can only explain the phenomena found in developing tissues by accrediting to each element a separate entity, and admitting it to be possessed of an hereditary tendency which will result in the production of tissues in accordance with the typal demands of the parent from which the original cells, ovum, and spermatozoa sprung. No one will be bold enough to hold that the father has any direct influence upon the developing fœtus except through the mother; and few claim that the mother has much influence over it during fætal life, and certainly none in the oviparous fish and fowls; for instance, where the ova, after being impregnated, are cast off to look out for themselves, and are not brought under the vital control of the parent; and yet the type is always reproduced even more faithfully than in viviparous animals. Now, we must admit,

from the phenomenon of development as well as the morphological appearances of tissues, that the body is composed of innumerable elements, termed cells, which have stored up within themselves distinct hereditary tendencies, which in some cases develop a hair, another a gland, and still another the enamel organ of a tooth, according to the typal demand found in the cell itself.

The slides are at the disposal of any one desiring to speak on the subject, and I hope they will ask for any specimen they wish to speak upon.

On motion of Dr. Watkins, a vote of thanks was tendered to Mr. Smith for his kindness in giving the magic latern exhibition.

Dr. Carl Heitzmann.-Mr. President, we have been treated to a large number of drawings, or photo-micrographs, and a still larger number of words. All of which, I suppose, was extremely interesting to every one who knows a little of the microscope and does not penetrate very deeply into the subject of the formation and character of the tissues. It is a strange thing, indeed, to see how few people are able to do some thinking of their own. The brains of most people are like street organs, which are capable of playing certain tunes only; whenever the machine is wound up and let loose, nothing but these tunes are played over and over again. So it is with some persons who have been impressed by reading books and listening to the teacher's words. It is fifty years since Schwann started the cellular doctrine; and, of course, it clings to the brains of the majority of people in our day, even after all the efforts of some sceptics, who have tried it faithfully and found it of very little value. The doctor speaks of cells, referring to the text-books. Why should the cell-doctrine be correct? Because the books say so? May I ask the essayist whether he is able to give a definition of a cell? I am sure he will say no. Nobody knows: and certainly I do not expect it from him, because bright men have made futile efforts to give a definition of a cell. The best definition is given by Drysdale, of London, who says a cell is a gun without lock and barrel. And this indefinite thing that we call a cell is the basis still of modern histology.

We know that the smallest piece of living matter is able to grow and to move; and thus will do everything that a large piece can do, such as an elephant. I am sure the word "cell" will not add the least particle to our knowledge of living matter. Such a thing as the cell does not exist in the tissues. It has been proven by myself, seventeen years ago, that within the tissues of the human organism there are no individual cells. I am surprised that

Dr. Sudduth thinks that work is not even worthy of mention. I have, by real hard study, shown that what the profession has been told was made up of individual cells is uninterruptedly connected throughout the tissues. Why does the essayist ignore it? My views have been endorsed by a number of good men, such as Abbott, Bödecker, Atkinson, and a score of others, who are convinced that there are no individual cells whatever in the tissues of the body; that what are called individual cells are, in fact, uninterruptedly connected, and that the intervening mortar, as the essayist calls it, is just as much alive as the so-called cells themselves, for all that we can find out. Why should Dr. Sudduth ignore what Stricker has said since 1880, and which is entirely opposed to the cellular theory, that there are no individual cells in the tissues, and that the protoplasm has just as much life as the basis-substance?

Since about eight years the botanists have come to our rescue. and now support the same theory. There is not a single botanist of note who is not convinced of the fact that what has been called the individual cell is not at all individual, but that throughout the cement-substance, or cellulose, there prevails a continuity by threads of living matter, piercing the apparently inert cement-substance, and that all plants are but one continued individual from the ends of the rootlets up to the points of the leaves,-and that is just what I have claimed seventeen years ago in relation to animal organisms. The tissues, therefore, are not made up, as Dr. Sudduth says in rather queer English, of innumerable numbers of cells which may be considered individuals, but are continuous masses of protoplasm. It is sad that seventeen years' effort on my part has left me almost alone in this assembly, with the exception, perhaps, of Dr. Atkinson. We know very well that such efforts, although just the opposite to the current street-organ tunes, are hard to comprehend and hard to accept. If I had happened to be born a century earlier I would have been burned at the stake or stoned to death for my heretic teachings. To-day I take it easy, because my conscience is clear. If I maintain anything, I can show it, -not with photomicrographs though. That is a poor way. The photograph cannot give a correct idea of the structure of the tissues; you must study them with the microscope directly, and then form your own judgment from what you see. Histologists have discovered very wonderful things, and Dr. Sudduth especially discovered the naked cell. I suppose his next discovery will be cells with pants on.

As to the similarity in formation between the hair and the enamel organ, or rather the enamel cord, that was shown forty

years ago by Todd and Bowman, who, in their celebrated cyclopædia, have asserted that teeth are tegumentary formations, on account of the similarity of origin of the hair and teeth. just as sure it is that the similarity between the epithelial formation of the hair on the one side, and of the enamel organ on the other side, is very slight. The enamel cord begins to show in the sixth week of embryonal life; the hair in the twelfth. The hair is epithelial in its origin, and remains epithelial throughout life; the enamel organ, on the contrary, is epithelial only so long as it is a cord: as soon as the cord broadens to the enamel organ it ceases to be epithelial tissue. In the first edition of A. Kolliker's work on histology, issued in 1852, he claimed that the enamel organ is connective tissue; yet much later-I do not know from what cause-he changed his opinion and held that the enamel organ is epithelial throughout. So long as he was unprejudiced by the later writers,-Remak, His, Waldeyer, etc.,—he took the enamel organ for what it is, a reticulum of connective tissue. At first the similarity of growth between the hair and the enamel organ is striking, but as soon as the enamel cord develops into the enamel organ it ceases to be epithelium; it changes to medullary tissue, and finally forms the enamel.

In conclusion, I wish to draw attention to two mistakes that Dr. Sudduth made; one historical, the other grammatical. The historical mistake is that he said Pasteur first described the anthrax bacillus. No; that was Davaine, in 1863. The grammatical mistake is where he spoke of the Stentor as being infusoria. In the Latin Stentor is singular; therefore infusorium.

Dr. Atkinson.—I do not think, Mr. President, it is at all worth while for me to make any remarks before this body. If there were five or six of us to sit down, with a nice bottle of champagne, and talk this matter over, we might arrive at something.

This question has been discussed in various societies by gentlemen who think they discussed it, but who did not comprehend the first postulates of what the difference between them is. The difference is more a matter of verbiage than of doctrine. That is the reason that it is so difficult to define what a cell is. I am astonished that men so strongly marked with the love of truth will not accept what Professor Heitzmann has brought forward, but still remain in a persistent effort to regard their nominations as of more value than the advanced truth that is couched in the better language of Professor Heitzmann. They persist in using the name cell, utterly refusing to define the thing intelligently. Every single pathologist

has committed that error, from Schwann down to this day. They have given us simple cells, nucleated cells, nucleolated cells, and now we have naked cells. That is a necessary result of a bad beginning. I am so much of a baby as to like to hear the little lispings and see the efforts of the growing mind to tell what it has found. I feel that a baby is the divinest thing on the planet, and this is our baby.

I won't talk about the grammatical part of it. I concede that it is better for a mixed and general audience to demonstrate with one specimen by photo-micrographs, so that all can see the identity of that which is presented. Here we have it represented on the screen the same to all, only in the difference of stand-point that we occupy; by which method there is less ambiguity than there would be were each individual to look through the microscope for himself, by reason of the necessity for the adjustment of the focus to different eyes.

How is it that we get the germ at all? There has been nothing said about that. But if we have to go farther, I have no doubt Professor Sudduth would give us in a very lucid manner the metamorphoses through which the two semens go; the ovum standing as one, and the spermatozoa standing as the other postulate; then they must have their potentialities awakened so that they combine into a homogeneous mass, unlike either of them, and which is now a prepared germ, holding within it the class, genus, species, and variety of the parent stock from which it was taken. It appears under the microscope as nothing but a cloudy mass, which has lost its former characteristics, and is now differentiated into the epiblast, hypoblast, and mesoblast; and then they enter into a quarrel as to whether the mesoblast has a different origin, or whether, in the proliferation of these indefinite corpuscles,—you see I use the term corpuscle; they are bodies, -some of these shall come from the epiblast, and others from the hypoblast, and then become the basis-substance of the splanchnic walls and body-walls of the organism that is of the same typal demand, according to the class from whence the protozoa were derived; holding all these potentialities during the metamorphoses, and during the storing of the radiancy that constitutes the starting-point of each one of the granules, the accumulations of which constitute the indifferent bodies known as indifferent corpuscles, embryonal corpuscles, multinucleated and giant cells, of which the bone-plates, nerve-plates, and muscle-plates consist, from which the tissues arise by due increment and appropriation of the stored radiancy, according to the typal demands; first corpuscles, then tissues, then organs, then systems, according to the types of the stock from which they came.

If we would correlate our ideas into a clean understanding of what is atomic life, molecular life, corpuscular life, tissual life, systemic life, and conscious life, we would be able to get a syllabus that would be quite cognate with all the apprehensions of each individual discoverer, so that each should use his own term as a first nomination, and then give different terminations to indicate, in adjective form, as prefixes or affixes, whatever differentiations were made, so as to get rid of these difficulties, and then see eye to eye, and travel together with more profitable progress.

But after all, what is the difference? Each individual does understand something of what he tries to see; and the more earnest the man is the more liable is he to have a sort of paternal affection for his own nominations, and he may be even weak enough to run the thing into the ground by being determined to have everybody follow his nominations. I have no interest in the matter further than to get at the best way to apprehend and promulgate the truth.

Adjourned to half-past nine o'clock to-morrow morning.

Friday, July 19.-Morning Session.

DISCUSSION OF DR. SUDDUTH'S LECTURE TAKEN UP.

Dr. Sudduth.—Mr. President, it would be hardly possible to add anything to what was said last night, without having the slides present to enforce what was brought out. I will simply say that I am willing to allow the case to go before the jury with the presentment I have made on the screen, as opposed to the discussion of the lecture on the other side. You have to carry away in your mind's eye the visible shadows of those tissues, and that will perhaps reinforce somewhat your memory in regard to what was said. The lecture I gave last night was a continuation of one on the same subject a year ago, when we took up general embryology; this year we have considered cellular morphology and the hereditary tendencies that reside in the tissues.

One or two things that were said last night were rather amusing to me. I am sorry that Dr. Heitzmann is not present to hear my reply.

In regard to the term "naked cell," to which he took exception, I will say that I was hunting around for words that would be simple and understandable, and so avoid technical terms; and I used

a term that Zeigler had used to indicate a mass of protoplasm containing a nuclear structure without a cellular limit or wall; that he called a "naked cell." Zeigler is perhaps the most extensively read pathologist in Europe, and he used the term "naked cell" to express the infant cell. It was not new with me, but came to my mind as I was talking, and I used it in that connection. I do not want to force it upon you at all and do not propose to.

Another point was Dr. Heitzmann's correction of an alleged grammatical slip. That was really amusing to me. If Dr. Heitzmann were more conversant with English he never would have fallen into the error he did. There are quite a number of the Stentor family. Dr. Peirce will tell you that he has traced ten or fifteen different varieties of them. I said Stentor infusory, to signify, as it does, one of the Stentor family. Webster defines infusory as a noun, plural, infusories, one of the infusoria; an infusorial animal; and that is the sense in which I used the word. It was amusing to me that Dr. Heitzmann should have allowed himself to have been tripped up in that way.

What I said in reference to Pasteur was that he had done more, perhaps, in the study of anthrax bacilli than any other man; and that is a fact. While Pasteur may not have really first discovered the anthrax bacillus, he has done more towards its cultivation and study than any other man, and he deserves the honor. I was particular to say that any slide which the gentlemen wished to speak upon would be produced if they would call for it. He did not ask for a single slide, but went into a few generalities and personalities. When a man has to descend to such a line of argument as did Dr. Heitzmann last evening, he must have a very poor case indeed. Several remarks which he made in his speech were a sufficient answer to his own position. He said that Schwann proposed fifty years ago the name cell, and that it had continued in use until now, with but little change, and that he (Heitzmann) stood almost alone, with two or three of his friends and students, in opposition to Schwann. That seems to me a complete answer to his objections to the use of the word cell. It has stood through fifty years, and is used to-day almost exclusively in the text-books. That is sufficient proof that it is good enough to keep, and I do not propose to drop it because Dr. Carl Heitzmann does not like it. He spoke sadly of the fact that he had been seventeen years striving to get his theories accepted; and he had not got them any farther than the few he referred to. There was his own evidence that the presentation he

nas given has not been accepted by the scientific world; and now he is trying to pose as a martyr before the world, saying he would have been burned at the stake if he had lived at an early day. The fact is that he has had the most kindly treatment by those who have opposed him, and he himself is the man who has been dogmatic and intolerant, and tried to browbeat those who opposed his theories. He is the twelfth juryman who abuses his eleven associates because they disagree with him.

As to Dr. Heitzmann's personal and wholly uncalled-for attack at the banquet last evening I have nothing to say, as I had not then. It is only in keeping with his idea of scientific discussion, and can only best be met with silent contempt.

The lecture was long and tiresome, and I fully appreciated the attention that was paid to it. I am pleased to be with this society; I always enjoy my trips down here; and if I can at any future time be of service to the society in this connection, I will be glad to serve you.

Subject passed.

Editorial.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Dental Examiners held its eighth annual session at Saratoga Springs, N. Y., commencing Tuesday, August 6, 1889.

The following State boards of examiners were represented: Colorado, P. T. Smith; Delaware, C. R. Jefferis, T. H. Gilpin; Georgia, A. G. Bouton; Illinois, C. R. E. Koch; Indiana, S. T. Kirk; Maryland, T. S. Waters; Massachusetts, L. D. Shepard, J. S. Hurlbut; New Jersey, F. A. Levy, J. G. Palmer; Ohio, J. Taft, H. A. Smith; Vermont, George H. Swift, James Lewis.

The following colleges were declared "reputable,"—that is, in the eyes of the association, as conforming to the standard which it has adopted and on which it will recognize their diplomas and admit their graduates to practice without requiring an examination:

American College of Dental Surgery, Chicago, Ill.

Baltimore College of Dental Surgery, Baltimore, Md.

Boston Dental College, Boston, Mass.

Chicago College of Dental Surgery, Chicago, Ill.

College of Dental Surgery, University of Denver.

College of Dentistry, Department of Medicine, University of Minnesota, Minneapolis, Minn.

Dental Department, Columbian University, Washington, D. C.

Dental Department of Northwestern University, Chicago, Ill.

Dental Department of Southern Medical College, Atlanta, Ga.

Dental Department of University of Tennessee, Nashville, Tenn.

Harvard University, Dental Department, Cambridge, Mass.

Indiana Dental College, Indianapolis, Ind.

Kansas City Dental College, Kansas City, Mo.

Louisville College of Dentistry, Louisville, Ky.

Minnesota Hospital College, Dental Department, Minneapolis, Minn. (Defunct.)

Missouri Dental College, St. Louis, Mo.

New York College of Dentistry, New York City.

Northwestern College of Dental Surgery, Chicago, Ill. (Defunct.)

Ohio College of Dental Surgery, Cincinnati, Ohio.

Pennsylvania College of Dental Surgery, Philadelphia, Pa.

Philadelphia Dental College, Philadelphia, Pa.

School of Dentistry of Meharry Medical Department of Central Tennessee College, Nashville, Tenn.

St. Paul Medical College, Dental Department, St. Paul, Minn. (Defunct.)
University of California, Dental Department, San Francisco, Cal.
University of Iowa, Dental Department, Iowa City, Iowa.
University of Maryland, Dental Department, Baltimore, Md.
University of Michigan, Dental Department, Ann Arbor, Mich.
University of Pennsylvania, Dental Department, Philadelphia, Pa.
Vanderbilt University, Dental Department, Nashville, Tenn.

Because a college is not on the list does not necessarily indicate that it is not a thoroughly reputable institution, as was shown in the case of the Dental Department of St. Louis College of Physicians and Surgeons. This institution applied for recognition, but owing to insufficient information, the fault of the college in not sending a representative, the association was unable to take final action.

Two new States-Delaware and Colorado-were admitted to membership. It seemed strange that the great State of Pennsylvania, with three colleges within her borders, representing fully one-third of the dental students in this country, should not feel sufficient interest in the enforcement of dental laws to send a delegate, but such was the case. We call upon the board to rise and explain its delinquencies in the matter. In view of the fact that there is some doubt existing in the minds of the profession regarding the constitutionality of laws governing the practice of dentistry and of medicine, and because of the recent decision of the Supreme Court of New Hampshire, declaring unconstitutional the law requiring a license as a requisite for practice in that State, it behooves the boards of the several States to support one another, and adopt such uniform action as not to trust the contest of the constitutionality of their laws in the courts, or they may find themselves without any law, which would be a serious retrogression.

Considerable other business was transacted. The standing Committee on Colleges, consisting of the following gentlemen, Drs. L. D. Shepard, C. R. E. Koch, C. R. Jefferis, F. A. Levy, and S. T. Kirk, was instructed hereafter to take cognizance of and investigate all charges against colleges, and report a revised list of colleges at each annual meeting; this same committee was also given authority to inquire into the proper equipment and organization of colleges not now on the list, in order to be able to report as to the capability of such institutions to give acceptable instruction, both as to the quality and quantity of its teaching.

The action of the officers in omitting the name of the University of Maryland, Dental Department, from the printed list of recog-

nized colleges last year was sustained. A resolution intended to explain the term reputable was adopted, to the effect—

"That it is the sense of this association that no one should be permitted to assume the responsibilities of a dental practitioner until he shall have had at least three years' previous study and instruction, inclusive of three full terms of not less than five months each, in a properly organized and equipped dental college, provided that time spent in the study of medicine or graduation from a medical college may be credited on this requirement not to exceed the period of two years or two full terms of collegiate instruction; and recommending to such State boards of dental examiners as are by the laws of their respective States required to issue licenses to practise dentistry to all holders of diplomas from reputable dental colleges that they make such rules as shall require all colleges to make three full calendar years of study and the attendance upon three full college terms of not less than five months each a prerequisite to graduation; and that only such colleges as shall comply with this rule on or before the beginning of their scholastic year of 1890-91 should thereafter be considered as reputable; and that all State boards should, when their State laws permit the same, decline to grant a license to practice to any one who cannot produce evidence showing that he has spent at least three full years in study and preparation before attempting to assume the responsibilities of a dental practitioner."

The association showed every determination to stand by the National Association of Dental Faculties and assist it in enforcing its new departure, if necessary.

The following officers were elected: T. S. Waters, Baltimore, President; C. R. E. Koch, Chicago, Vice-President; F. A. Levy, Orange, N. J., Secretary-Treasurer.

Adjourned to meet at the time and place of the next meeting of the American Dental Association, at 9 A.M. of the first day.

A STEP IN ADVANCE.

THE sixth annual session of the National Association of Dental Faculties was held at Saratoga Springs, N. Y., August 5, 6, and 7, 1889.

This proved to be one of the most important sessions of the association since its organization. Although at first organized as a delegate body, the requirements for representation had became lax until last year, when it was found that few colleges had sent duly authorized delegates to represent them in the deliberations of the association. Steps were taken at that meeting to insure against such a contingency the present year, and with the effect that out

of the twenty-six colleges, members of the National Association of Dental Faculties, the following twenty were represented by authorized delegates:

Baltimore College of Dental Surgery, R. B. Winder. Boston Dental College, J. A. Follett. Chicago College of Dental Surgery, Truman W. Brophy. Columbian University, Dental Department, J. Hall Lewis. Dental Department of Southern Medical College, L. D. Carpenter. Dental College of University of Michigan, J. Taft. Harvard University, Dental Department, Thos. Fillebrown. Indiana Dental College, J. E. Cravens. Kansas City Dental College, J. D. Patterson. Louisville College of Dentistry, J. Lewis Howe. Missouri Dental College, W. H. Eames. New York College of Dentistry, Frank Abbott. Ohio College of Dental Surgery, H. A. Smith. Pennsylvania College of Dental Surgery, C. N. Peirce. State University of Iowa, Dental Department, A. O. Hunt. University Dental College, J. S. Marshall. University of Maryland, F. J. S. Gorgas. University of Pennsylvania, Dental Department, James Truman. Vanderbilt University, Dental Department, W. H. Morgan.

The Philadelphia Dental College, the Dental Department of the National University, the School of Dentistry of Meharry, Medical Department of Central Tennessee College, and the University of California, Dental Department, were not represented.

All the plans had been well laid for decisive work and all seemed to feel that an important step was to be taken. The attendance of seventeen colleges was necessary to constitute a quorum, and if at any time there had been a desire upon the part of any institution to block the wheels of legislation, it could easily have been done by withdrawing, as a bare quorum was present at any one sitting; but to the honor of the men who constituted the body, they were willing to abide by the honest decision of the association, and no filibustering was indulged in. Three vital questions were to be considered, and the discussion at times waxed warm.

At Monday's session credentials were examined and an organization effected. To facilitate business all the resolutions and amendments offered last year, which, under the constitution, had to wait a year, were now laid on the table.

On Tuesday, Dr. Truman moved to take from the table Dr. Howe's resolution of last year and consider the first clause,—viz., "That attendance upon three full regular courses, in separate years,

be required before examination for graduation." A warm discussion followed, in which the representatives of the Southern dental colleges took a firm stand against the movement, basing their argument upon the ground that it was premature; that the medical colleges in their part of the country, at least, required only two years of five months each to make a physician, and that until such time as their course was lengthened any extension of the dental course would militate against the dental colleges and drive students into medicine instead of dentistry. The other side of the question was upheld as warmly by its adherents; but the hour growing late, with no probability of a vote's being reached that evening, a motion to adjourn was entertained, and the members retired to sleep over the question.

When the question was brought up the next morning and the roll called, it was found that eighteen delegates responded. The discussion was renewed with considerable ardor, the following gentlemen participating: Drs. Marshall, Abbott, Follett, Carpenter, Allport, Truman, Peirce, Morgan, Patterson, Sudduth, Gorgas, Taft, Brophy, Chandler. A vote finally having been reached, the count showed twelve for extension of time and six against. The six negative votes were afterwards cut down to four by a change in the vote of the Dental Department of the University of Maryland and the Southern Medical College, leaving the vote fourteen to four. On the next clause of the resolution, relating to length of term, the vote stood eighteen to one in favor of five months, the one vote was for a longer term.

The next question taken up was as to when the new rule should go into effect, and this was set for the beginning of the session of 1891 and 1892.

A motion was then entertained and passed, requiring the colleges belonging to the association to publish in their announcements for 1890-91 the action of the association regarding the extension of the course. This was done to avoid all confusion in regard to the matter.

The utmost good feeling predominated, and all seemed to fall into line without any reservation, which was one of the most assuring features of the movement. Twenty out of the twenty-five active colleges recognized by the National Association of Dental Examiners, are now bound by their vote to adopt the new rule, and the other four, which have made application for membership, had pledged themselves in advance of the action of the association to support a three-years' course. One feature to be noted is that

nearly all the younger institutions were ardent advocates of the need of lengthening the course.

The National Association of Dental Faculties has done a most excellent work in the five years of its existence, and stands a fitting rebuke to those medical colleges of our country which are still holding back in the onward movement of scientific education. The dental profession is to-day better organized than any other of the learned professions in this or in any country, with its colleges united into one harmonious association, working for the upbuilding of the standard of the specialty which they teach. With statutory enactments in a large majority of the States, and a thoroughly organized national association of dental examiners, consisting of delegate members from the boards of examiners of the several States that have laws governing the practice of dentistry, we may well be proud of our position, and respectfully challenge the medical profession to emulate our example. The dental colleges could not have taken a step better calculated to establish it undeniably among the learned professions than the one just adopted. With a three-years' graded course of instruction and with preliminary and intermediate examinations, they present to the world as good standing as can be claimed by any institution in this country. Whether dentistry is ever recognized as a specialty of medicine or not, she is fast making strides towards perfection in her own ranks that will entitle the degree of D.D.S. to as much consideration as any degree granted in this country, and when we come to consider her youth and her wonderful achievements, we may well exclaim, "What a precocious child!"

The action of the association is sure to receive favorable remark from the medical press. The first we have observed comes from the *Times and Register*, Philadelphia, which we take pleasure in copying. After stating what action had been taken the editorial says,—

"It will thus be seen that the dental profession has taken a decided step in advance, one which places it ahead of the profession of medicine, and in fact puts the latter into the position of requiring less time for the study of the whole science and art of healing than modern dentists demand for the acquiring of a small portion of the same art. The action of the association will be endorsed by all the dental colleges. In fact, they will be practically compelled to do so, as dental boards exist in many States, which are united in an Association of Dental Examiners. This body has the power of forcing any recalcitrant college into conformity with its requirements by refusing to recognize its diplomas without examination. A Baltimore college defied the association for one year, but was glad to come into the fold before the opening of the next term.

"The Association of Dental Faculties has been in existence for five years, and in that short period has accomplished three decided reforms in dental education. First, it put a stop to the practice of allowing practitioners of five years' standing to enter the graduating class. Then it established the graded course, with preliminary and junior examinations; and, finally, it has instituted the great reform herein recorded. One result of this action will be to increase by one-half the cost of the dentist's course of instruction, as the same body regulates the fees to be charged at dental colleges, and the student has now to pay for three terms.

"It will thus be seen that the dental profession is much better organized than the medical, and that this is made possible largely through the influence of legislative enactments; further, that this has made possible an advance in dental education, which could not have been secured otherwise, as the weaker schools would have held back those desirous of lengthening the course. The difficulties in the way of procuring suitable legislation are much less in dentistry, as there are no homoeopathic or eclectic dentists."

The following officers were elected for the ensuing year:

James Truman, President; L. D. Carpenter, Vice-President; J. E. Cravens, Secretary; A. W. Harlan, Treasurer; Frank Abbott, J. Taft, and F. J. S. Gorgas, Executive Committee.

The following committees were appointed: Ad Interim Committee, Drs. T. W. Brophy, R. B. Winder, and J. A. Follett; Committee on Schools, Drs. H. A. Smith, J. D. Patterson, J. Lewis Howe, W. H. Morgan, W. H. Eames.

Adjourned to meet at the call of the Executive Committee.

INDEPENDENT vs. TRADE JOURNALISM.

In our January number we discussed the claims of the Journal to the support of the profession, and among other things said that ours represented "a journalism that knew no interest except that of the profession, because it was owned and controlled by members of that body." We did not deem it necessary at that time to draw any comparison with other journals, but circumstances over which we have had no control have within the past few months forced us to show wherein some journals, at least, cannot, by reason of their business relations, fairly represent the interests of the profession at large.

When the Dental Protective Association was first organized, Dr. Crouse came to us and allowed us the *privilege*—we use the word advisedly—of bringing the movement before the profession. This

we did fully and freely, writing editorials upon the subject, and calling attention to it in each succeeding issue. The matter was also presented to the *Cosmos* with the request that the printed circular should be published with some editorial comment, and at the same time suggesting that a journal which had so long received the support of the profession should feel called upon to present a matter fraught with so much interest to the general body. The question was taken under advisement, and after a time a short extract of the circular appeared without editorial comment, either for or against.

The experience of S. S. White in his fight for the profession with the old Vulcanite Company is no doubt having its influence in shaping the course of the publishers of the Cosmos in regard to the present controversy between the Dental Protective Association and the International Tooth Crown Company, which is the immediate successor to the Goodyear Dental Vulcanite Company. We are not at all surprised that the Cosmos steers clear of the fight. The position of the house now is very different from what it was at the time of the contest with the rubber company. S. S. White was an individual, and the present management is a corporation. It is well known that corporations have less liberty of action and are generally much more conservative than individuals. Questions of the present character are more apt to be weighed from a dollar-andcent view. This is so well known that it is a common remark that "corporations have no soul." The company publishers of the Cosmos are good business-men and know how to look after their large interests.

They are not engaged in journalism from philanthropic motives,—simply from the love of it; nor do they lose sight of the fact that journalism is only a minor part of their business. With them journalism consists in steering skilfully their craft over the shoals, avoiding as many rocks as possible, for rocks represent customers, and to hit them too hard or too frequently might seriously interfere with the footings up of the ledger at the end of the year. Their main idea is to make as few enemies and to sell as many dollars' worth of goods as possible. An aggressive journalism would be inimical to such a policy and need not be looked for.

In proof of the above statements we cite the course of the Cosmos for many years past, and ask when or where has it editorially taken an active part in any of the discussions which have agitated the profession. What the profession needs is an organ that shall without fear or favor discuss all questions of a public nature, and

566 Editorial.

form a medium through which the profession may find a voice. The International Dental Journal offers such a medium, and calls upon the profession to rise and support it heartily. The course of the Independent Practitioner has been sufficient evidence in the past that the policy of the Journal has been to discuss all matters of public policy entirely without bias. The past year under our management has been no exception, and we feel safe in saying that we fully understand wherein our duty lies, and shall under all circumstances be found trying to fulfil it to the utmost of our ability.

We are to-day in better shape to lead in dental journalism than ever before. We are fully equipped for the publication of a strictly first-class journal. We have our pick of the productions of the best men in the profession. We are unhampered by business entanglements, which, as we have shown, prevent a journal from expressing an unbiased opinion on subjects of interest to the profession; and lastly, we have the hearty support of the dealers and manufacturers, nearly all of whose advertisements are to be found in our advertising pages. We present to you each month not the goods of one house, but the specialties of all the leading houses of the country. In this latter respect we claim precedence over any other journal published in this country. For the same price charged by other journals we not only present to you the choicest literature of the day, but also bring to you each month all that is new and important in office, laboratory, and shop.

While we accept the advertisements of all reputable houses, yet, by so doing, we do not in any manner sacrifice our independence of expression, but hold ourselves free to criticise any article or house when in our opinion the good of the profession demands it.

SPECIAL NOTICE TO NEW SUBSCRIBERS.

We offer the Journal from now on to January free to all persons who will send in the subscription price, \$2.50, for the year 1890, before the 15th of October. We make this unprecedented offer in order to increase our subscription-list, well knowing that when a subscriber's name is once on our books, he will not drop out. This offer is only made to persons who have not been subscribers. Please take the trouble to tell your friends of the above offer.

Foreign Correspondence.

TO THE EDITOR:

In following the discussion on the probable method of attachment of implanted teeth, I have noticed an uncertainty as to the possible result of the implantation of a tooth devoid of its pericemental membrane.

I have a case which will give positive data, and herewith submit it. Patient, a lady of fine physique, aged say thirty, general health good, called March 22, 1887, suffering from a chronic abscess of the left superior second bicuspid root. Attempts at treatment and crowning having failed, and the outer plate of the alveolar wall being gone, and with fistulous opening, the remainder of the end of the root was extracted under gas on August 19, 1887.

The abscessed socket was treated with phenol sodique, wiped out with a pledget of cotton soaked with it, and left open to heal. On the 24th, five days later (I generally leave these cases ten days), the patient presented herself, and requested the implantation of a tooth, which in the mean time had been prepared in the following manner:

Not being able to find a bicuspid of proper color and form, a dry, healthy molar root was excised and a Logan crown fitted to it, and set in Weston's cement. This was put in the usual solution of bichloride of mercury (1 to 1000) and gradually heated up while distending the now contracted walls of the partially-healed socket, with cones of cotton. Imagine my surprise on examining my tooth to find the water almost boiling, and the pericementum entirely peeled off the distal surface of the root. The entire pericementum was now dead beyond possibility of resuscitation,—the cooked portion on one side remaining. The socket being prepared, I decided to insert the tooth to keep it open until another tooth could be prepared.

I have no memorandum of the date of the removal of the ligatures and plate which held the tooth; but on her return, several days later, the tooth was found to be attached so firmly that it was decided to leave it until it should become loose.

I have seen the tooth occasionally since, and to-day, after fifteen months of such service as an otherwise perfect set of teeth is sub-

jected to, it has grown quite healthy and firm. By probing, an alveolar wall and healthy membranes were found entirely surrounding it at depths of two, three, and four millimetres above the gum margin, preventing the thin flat probe from entering farther, and giving healthy blood at each puncture. The side on which there was no pericementum, when the tooth was implanted, differed in no way from the other, and the patient uses this side of the arch almost exclusively, owing to the tenderness of the second bicuspid root on the opposite side, which was treated and crowned at the same time.

I have other cases under observation, one of an exactly similar character as regards the socket,—that of a seriously abscessed nature,—with absorbed outer alveolar wall, where a sound healthy tooth with good pericementum was implanted, ten days after the extraction of the diseased root. The development and restoration of the outer alveolar wall has been complete, and, after seventeen months' good service, has a firmness about it and a peculiar ring on percussion that would indicate the possibility of bony anchylosis.

The latter case was reported at the meeting of the American Dental Society of Europe, at Coblenz, August, 1887, it having been implanted March 15, of the same year, and being, to the best of my knowledge, the first case reported of the operation of implanting a dry tooth of indefinite antiquity in a natural socket. Dr. Elliott then volunteered the remark that the root would be absorbed, but judging from its appearance a month ago, when I filled a small cavity on its distal surface, caused by extensive decay on the mesial surface of the adjoining tooth, nature has not decided to take the course suggested by the president of the society.

In a correspondence with Professor Miller, he informs me that the best artificial medium for preserving pericementum or other animal tissue *alive*, is the physiological salt solution 0.75 table-salt to 100 water. He further says, "Under ordinary circumstances warm sublimate solution, 1 to 1000, will completely sterilize an old tooth in half an hour. If, however, the pericementum is thick and very dry and hard, I have my doubts about it.

When old teeth are used I see no reason at all why one should not use stronger solutions, say 5 to 1000; it cannot do any harm to the already dead pericementum.

To remove the sublimate before implanting, one can wash the tooth in water which has been sterilized by boiling.

Certain experiments, which may be easily repeated by any one, seem to prove that suitable disinfectants and antiseptics may with

time be made to penetrate the entire substance of the dentine and cementum. Take a dry three-rooted molar, and into two of the roots loosely place cotton saturated with eugenol and seal it up; in from one to three days, as the dentine is porous or dense, the eugenol will be found to have penetrated the entire dentine and cementum of the roots which were treated, leaving them semi-transparent, while the root which had no dressing will remain white, dry, and opaque.

If we place a dry tooth in any solution of an antiseptic nature, weighing it before and after treatment, with a delicate scale, the amount absorbed will be found to vary with the density of the tooth-substance. By coloring the medicament with an aniline color and crushing the tooth afterwards the coloring-matter will be found to have penetrated the remotest lair of the dreaded bacteria. Twenty-four hours is the shortest time which a tooth should remain in an antiseptic fluid, owing to the slowness of the osmotic circulation through the dense membranes of the tooth-substance.

The most rapid absorption is from the pulp canal into the dentine. The cementum being less easily saturated. However, the fluids seem to penetrate wherever germ-life can exist. What we now most need is a suitable preparation for placing the teeth in immediately on extracting, that they may be kept in an antiseptic condition, and never allowed to become dry. When the tooth dries out, the dentine being more largely supplied with water, then the enamel seems to shrink more and injure the suture-like union between enamel and dentine, for even after back teeth have been resaturated the enamel readily chips away from the dentine and the whole crown is consequently weaker.

L. C. BRYAN.

BASEL, SWITZERLAND.

Domestic Correspondence.

TO THE EDITOR:

I send you a copy of the law which has just passed the legislature repealing our old law of 1885. As you see, it places a premium upon dental education procured from dental colleges, but, by asking in addition an examination of those holding diplomas, demands that the colleges also shall deal honorably by the profession and their students by giving no unmerited degrees. It also provides that in addition to the regular examination candidates shall be provided by the Board of Examiners with patients upon whom to perform actual dental operations: it also defines dentistry. We hope that this law may not only be of great service to the interests of the commonwealth of Minnesota, but that it will at the same time offer a stimulus to worthy dental colleges and a check to diploma mills.

J. H. MARTINDALE, M.D.

TO THE EDITOR:

The sixth annual meeting of the Minnesota State Dental Association was held at the Spalding House, Duluth, July 10–12. There was a good attendance and an interesting programme. By way of entertainment the Duluth dentists gave the visitors a boat-ride on the lake, and Dr. Brown gave a reception at his residence.

The officers for the ensuing year are Dr. G. O. I. Brown, Duluth, President; Dr. L. C. Davenport, Moorhead, Vice-President; Dr. C. H. Robinson, Wabasha, Recording Secretary; Dr. M. G. Jenison, Minneapolis, Corresponding Secretary; Dr. H. M. Reid, Minneapolis, Treasurer.

The next annual meeting will be in Minneapolis, commencing the second Wednesday in July, 1890.

M. G. JENISON.

TO THE EDITOR:

A SEMI-ANNUAL union meeting of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York will be held in Elmira, N. Y., October 24 and 25, 1889. A large attendance is assured, and a meeting of unusual interest is expected. A more extended notice will appear later.

MYRON D. JEWELL.

Current News.

THE International Tooth Crown Company have brought a civil suit for sixty thousand dollars and six months' imprisonment against Dr. J. N. Crouse for interfering with their business.

It having been decided that it would not be the right thing to do to use the funds of the American Dental Protective Association for the defence of Dr. Crouse, the matter was brought to the notice of the members of the American Dental Association, when one thousand dollars was promptly voted from the treasury for Dr. Crouse's defence; a private purse, amounting to fully two thousand dollars more, was also quickly subscribed by members present. The subscription is still open, and names may be sent to this office.

The International Tooth Crown Company could not have done anything that would have tended more to rouse the profession than the suit instigated against Dr. Crouse, which virtually amounts to persecution of an honest man, who has taken upon himself the responsibility of the defence of the profession. You cannot do less than send in your membership fee to support him, especially when it will only be used to defend yourself from the oppression of the newly revised "Rubber Company."

The following resolutions were unanimously passed by the American Dental Association:

"In view of the injustice which the profession has sustained in the past, as well as the annoyances to which it may be subjected in the future, and fully appreciating the arduous and important labors of Dr. J. N. Crouse, of Chicago, be it

"Resolved, That Dr. Crouse is entitled to the earnest and practical support of every dentist in the United States; and further, be it

"Resolved, That the American Dental Association fully approves of the formation, the plans, and methods of the Dental Protective Association of the United States, and pledge to it our united and continued support and moral aid."

WE are informed that the office and practice of the late Dr Vanderplant is for sale at a decided bargain. See advertising pages for notice.

HAYDEN DENTAL SOCIETY OF CHICAGO.—The Hayden Dental Society was organized and incorporated under the laws of the State of Illinois, August 3, 1889.

The object of the society is the professional and social improvement of its members. Meetings will be held in Chicago on the third Monday of each month (except July and August).

The following officers were elected for the ensuing year: President, Louis Ottofy; Vice-President, A. W. Freeman; Secretary, A. J. Oakey. Board of Directors: J. W. Rogers, J. L. Ubellar, H. P. Smith.

A. J. Oakey, Secretary.

ABSTRACT OF A BILL FOR AN ACT TO REGULATE THE PRACTICE OF DENTISTRY IN THE STATE OF MINNESOTA.

Be it enacted by the Legislature of the State of Minnesota.

Section 1. From and after September 1, 1889, it shall be unlawful for any person to practise dentistry in this State, unless he shall first have obtained a certificate of registration thereto, and filed the same or a certified copy thereof with the clerk of the district court of the county of his residence, all as hereinafter provided.

SEC. 2. A board of examiners, to consist of five resident practising dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of the first board under the provisions of this act shall consist of the members of the present board of dental examiners, existing under chapter 199 of the General Laws of 1885, who shall hold their offices as members of such new board for the term for which they were appointed under said former act, and until their successors are duly appointed. All vacancies in said board shall be filled by appointment by the governor as hereinafter provided. The term for which members of said board shall be appointed shall be three years, and until their successors shall be duly appointed. It is also hereby provided that no person shall serve to exceed two terms in succession. In case of any vacancy occurring in said board in the term of any member of said board, such vacancy shall be filled for such unexpired term by the governor from names to be presented to him within two months of the occurrence of such vacancy by the Minnesota State Dental Association in the same manner as hereinafter provided. It shall be the duty of said Minnesota State Dental Association after September 1, 1889, annually prior to August 10 to present to the governor the names of twice as many practising dentists resident in this State as there are regular members to be appointed of said board prior to September in the following year. All appointments by the governor

shall be made within twenty days of the submission of such names to him, and if such names shall not be submitted to him within the allotted time, he shall make his appointments within twenty days from the expiration of the time allotted for such presentation of names from among the resident practising dentists. *Provided*, That nothing in this act shall prevent the appointment of two members of said board from among the resident practising dentists not members of said Minnesota State Dental Association, if the governor shall so elect.

SEC. 5. Any person or persons who shall desire to begin the practice of dentistry in the State of Minnesota on and after September 1, 1889, shall file his name, together with an application for examination, with the secretary of the State Board of Dental Examiners, and at the time of making such application shall pay to the secretary of said board a fee of ten dollars, and shall present himself at the first regular meeting thereafter of said board to undergo examination before that body. In order to be eligible for such examination such person shall present to said board his diploma from some dental college in good standing, and shall give satisfactory evidence of his rightful possession of the same, provided also that the board may in its discretion admit to examination such other persons as shall give satisfactory evidence of having been engaged in the practice of dentistry ten years prior to the date of passage of this act. Said board shall have the power to determine the good standing of any college or colleges from which such diplomas may have been granted. The examinations shall be elementary and practical in character, but sufficiently thorough to test the fitness of the candidate to practise dentistry. It shall include, written in the English language, questions on the following subjects: Anatomy, physiology, chemistry, materia medica, therapeutics, metallurgy, histology, pathology, operative and surgical dentistry, mechanical dentistry, and also demonstrations of their skill in operative and mechanical dentistry. All persons successfully passing such examinations shall be registered as licensed dentists in the board register provided for in Section 4, and also receive a certificate of such enregistration, said certificate to be signed by the president and secretary of the board. The examination fee shall in no case be refunded.

SEC. 6. Recipients of said certificate of enregistration shall present the same for record to the clerk of the district court of the county in which they reside, and shall pay a fee of fifty cents to said clerk for the registration of the same. Said clerk shall record said certificate in a book to be provided by him for that purpose. Any person so licensed removing his residence from one county to another in this State, before engaging in the practice of dentistry in such other county shall obtain from the clerk of the district court of the county in which said certificate of registration is recorded a certified copy of such record, or else obtain a new certificate of registration from the board of examiners, and shall, before commencing practice in such county, file the same for record with the clerk of the court of the county to which he removes, and pay the clerk for recording the same the fee of fifty cents. Any failure, neglect, or refusal on the part of any person holding such certificate or copy of record to file the same for record as hereinbefore provided for six months from the issuance thereof shall forfeit the same. Such board shall be entitled to a fee of one dollar for the reissue of any certificate, and the clerk of the district court for any county

shall be entitled to a fee of one dollar for making and certifying a copy of the record of any such certificate.

SEC. 7. All persons shall be said to be practising dentistry within the meaning of this act who shall for a fee or salary, or other reward paid either to himself or to another person for operations or parts of operations of any kind, treat diseases or lesions of the human teeth or jaws or correct malpositions thereof. But nothing in this act contained shall be taken to apply to acts of bona fide students of dentistry, done in the pursuit of clinical advantages under the direct supervision of a preceptor or a licensed dentist in this State during the period of their enrolment in a dental college, and attendance upon a regular uninterrupted course in such college.

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SEC. 9. Any person who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction may be fined not less than twenty dollars nor more than one hundred dollars, or to be confined not less than one month nor more than three months in the county jail, or both. And all fines thus received shall be paid into the common school fund of the county in which such conviction takes place.

SEC. 10. Any person who shall knowingly or falsely claim or pretend to have or hold a certificate of enregistration, diploma, or degree granted by a society or by said board, or who shall falsely and with the intent to deceive the public, claim or pretend to be a graduate from any incorporated dental college, not being such graduate, shall be deemed guilty of a misdemeanor, and shall be liable to the penalties provided in Section 9 of this act.

SEC. 11. Justices of the peace and the respective municipal courts shall have jurisdiction over violations of this act. It shall be the duty of the respective county attorneys to prosecute all violations of this act.

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SEC. 13. Every registered dentist shall in each and every year after 1889 pay to said Board of Examiners the sum of one dollar as a license fee for such year. Such payment shall be made prior to May 1 in each and every year, and in case of default in such payment by any person, his certificate may be revoked by the Board of Examiners upon twenty days' notice of the time and place of considering such revocation. But no license shall be revoked for such non-payment if the person so notified shall pay before or at such consideration his fee and such penalty as may be imposed by said Board. Provided, That said Board may impose a penalty of five dollars and no more on any one so notified as a condition of allowing his license to stand. Provided further, That said Board of Examiners may collect any such dues by suit.

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THE

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No. 10.

Original Communications.1

THE TEETH AS A FACTOR IN DIAGNOSIS.2

BY RICHARD C. NEWTON, M.D., MOUNT CLAIR, NEW JERSEY.

At a recent meeting of the Practitioners' Society of New York, a paper was read on the care of the teeth from a medical practitioner's stand-point, and a discussion followed. The paper was printed in the *Medical Record*, and the accomplished editor of that journal considered the subject of sufficient importance to notice the paper and the discussion upon it.

In this editorial Dr. Schrady intimates that the importance of the surgical diseases of the teeth is not recognized by the medical profession, and in Dr. Sexton's paper it is said that the sooner our medical colleges insist upon a knowledge in their students of oral surgery before graduation the better for all concerned.

Now, here is a lamentable state of things, if it be true that surgeons generally are noticeably ignorant of oral surgery. Surgery, both special and general, has made great advances of late years, and no doubt oral surgeons are better informed than ever before

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¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read before the New Jersey State Dental Society, at its nineteenth annual session at Asbury Park, July 18, 1889.

as to all surgical diseases of the teeth and jaws. It is certain that dental surgery is farther advanced than it has ever been, and that practitioners of dentistry are adding day by day to their knowledge and skill. I do not think that the medical aspects of the teeth are as well known as the surgical, nor that they have ever excited the general interest which their importance demands. It seems to me that we can spend a half-hour profitably in reviewing the literature of this subject, and in laying plans for future work towards elucidating and settling some of the questions that relate to the value of the shape, size, time of appearance, and other qualities of the teeth, in general diagnosis.

Can we tell anything about a person's constitution or habits, or anything relative to the presence of actual disease by merely examining the teeth? Not many years ago Mr. Jonathan Hutchinson published the results of his investigations in reference to the teeth in hereditary syphilis. Of course, you are all familiar with Hutchinson's teeth, which appear to be tolerably frequent in the syphilitic child. It is true that they are not always present in cases of undoubted syphilitic inheritance, and that teeth having these or similar peculiar malformations may be present in hereditary ataxia and rheumatism; and even sometimes in rickets.

Now, there is urgent need that the percentage of cases of hereditary syphilis showing Hutchinson's teeth should be determined. If possible, we should know wherein, if at all, the cases showing these teeth differ from those which do not show them. I might remark in passing that in such investigations the help of our dental confrères is absolutely necessary, or nearly so, before we can get at the truth. We want a great number of observations of people in health, or at least so well that they do not come to the physician. These important truths can be established only after years of study and observation; and I would fain implore you to record and report all your observations as to the peculiarities of the teeth. I remember some years ago a striking instance of the value of Hutchinson's teeth in determining the presence of a specific taint in a family of my acquaintance. Only one member of a family of four had these pronounced marks of the trail of the serpent, but undoubtedly the practised eye and skilful touch of a dentist might have detected certain peculiarities in the teeth of other members of this unfortunate quartette.

Dr. Harrison Allen and others in this country and several foreign writers have described so-called gouty teeth. Dr. Thompson, of Topeka, Kansas, read an address on this subject before the American Dental Association, in August, 1886, which was published in the *Dental Cosmos*, along with an excellent illustration of a cast showing the peculiarities of the teeth.

The different descriptions of the teeth, so far as I have read, agree, and there seems no doubt that when present, such teeth as Dr. Thompson described do indicate a gouty diathesis. Since gout is not a common disease in this country, it may not be out of place to remind you of its exceeding pathological importance. There is a form of Bright's disease which is known as gouty kidney. There are affections of the brain, eyes, liver, heart, and blood-vessels, not to mention the articulations, which are ascribed to the gouty diathesis. My own impression is that gout is not always recognized in this country, and that there is every probability that it will increase among us. Hence the great importance of any constant symptom which a patient may evince of the presence of a gouty tendency.

At the meeting of the Practitioners' Society referred to above, Dr. Gibney spoke of peg-shaped teeth, or peg teeth, and said that he often observed them in children with joint diseases. He thought that these teeth, instead of being called strumous or scrofulous teeth, would now be called tuberculous teeth. So far as this observation goes, it tends to show that there is a peculiar shape to the teeth in tubercular or scrofulous children, although I understand that the teeth of consumptives are as a rule good, at least in the earlier stages of the disease. This fact might be used in favor of the present theory to the effect that phthisis is at first a local and not a constitutional disease.

In cretins the teeth come very slowly, the process often occupying many years, and being accompanied frequently by an offensive salivation and convulsions.

In rickets the first dentition is delayed until after the child is twelve months old, whereas in hereditary syphilis the first dentition occurs before the sixth month. Hence the time of the cruption of the teeth enables us to distinguish between two diseases that were formerly confounded,—often to the great injury of the helpless patient.

In Bright's disease the teeth are said to be abnormally sensitive. This is a very important point, on account of the great frequency and fatality of this complaint, and on account of the difficulty which we often encounter in making a diagnosis early, the opportune time. It is true that examinations of urine are, as now made, very exact. But we have the authority of Professor II. C. Wood for saying that

in some cases of morbus Brightii the urine is unaltered, at least for considerable periods.

In scurvy and in lead poisoning the appearance of the teeth and gums is pathognomonic.

In idiots the teeth present every anomaly of appearance and disposition. They grow and are shed without any regard to order or rule. In "Seguin on Idiocy" a case is mentioned of an idiot girl of eighteen who was shedding her fifth set of teeth.

In idiots the number of teeth also seems to be frequently either above or below the normal. Writers tell of double and even triple rows of teeth in the jaws of these unfortunates. The pitted, notched, and stained teeth which we often see are said to indicate that their owner suffered from fever or other exhausting disease during the calcification of these teeth. A curious difference in the health and vigor of the teeth in the same jaw has often been noted, some teeth being soft and friable, and others firm and vigorous. This condition can generally be traced to a fit of sickness which seized the patient during the calcification of those teeth found to be unhealthy.

To sum up this review of the scanty literature of the subject, we may say that (to quote a writer in the Dental Cosmos) this is a subject of which we know a little and suspect much. The little we know is of undoubted value to the general practitioner; but thousands of observations are yet needed. It is no wonder that those who have looked into this matter deplore the anathy of the profession in general with regard to this important subject. People do not as yet sufficiently value their teeth, nor see to it that their children grow up with good teeth. It seems odd that such a distinguished writer and teacher as Professor N. S. Davis should have said at the International Medical Congress, in September, 1887, that he had said over twenty years before that the teeth are as important as any other part of the organism, and that dentistry would come to be a recognized specialty of medicine. I say it seems odd, because his saving it in the manner and at the time that he did would seem to show that there is still considerable doubt, even in the medical mind, about the importance of the teeth; and also some doubt about the dignified position which dentistry should occupy.

Now, if the teeth are as important as the eyes, why is it, to take a particular instance, that we have volumes of literature upon albuminuric retinitis, and nothing upon the teeth in Bright's disease? If the experience of others coincides with that of my friend, Dr. Watkins, who says that he has observed cases of Bright's disease in which the teeth cannot retain a filling because they are so exquisitely sensitive, it is high time that medical men knew something more definite of this phenomenon. Dr. Sexton says that in fifteen hundred cases of ear disease he found that perhaps one-third owed their origin or continuance in a greater or less degree to diseases of the teeth. One would infer that the aurist, at least, should be well up in dental pathology and therapeutics. We sadly need more literature on the teeth, and who can supply it better than some of the learned and scientific men who have done so much for American dentistry?

Another peculiarity of the teeth and jaws has excited some comment, and led to considerable research during the last few years. I refer to the V-shaped and saddle-shaped jaws. What interest as practitioners of medicine have we in these anomalies? Do these misshapen jaws and protruding teeth evince any special phases of constitution? Do they come from preventable causes, and do they affect the general health? I think that it has been pretty well settled that they do not belong to any especial diathesis. They seem to come from several causes, and to affect the health mainly because they are apt to cause mouth-breathing, a pernicious and hurtful habit. I have said that they cause mouth-breathing; I should probably have said perpetuate mouth-breathing; -for breathing through the mouth seems to be one of the principal causes of the condition. The enlarged tonsils which are so common in our American children, by more or less occluding the posterior nares, engender the habit of breathing through the mouth. The mouth is almost constantly open, especially during sleep. The lower lip hangs down and draws the extremities of the upper lip against the cuspids and bicuspid teeth. This constant pressure, especially during the eruptive period, forces the teeth inward, makes the upper jaw narrower, and pushes the incisor teeth forward and upward. This deformity can generally be cured if taken in time.

The narrow jaws of Americans have excited much discussion, without, so far as I know, any satisfactory explanations having been brought forward. We can say that our sharp physiognomies are a race peculiarity; but this is not an explanation. Probably, when we have learned to live better and eat more wholesome food, these peculiarities will measurably disappear. We exercise our jaws too little in chewing our food, whatever other exercise they may get. It is said that the custom of chewing gum is beneficial; that it develops and preserves the teeth and widens the jaws.

As to irregular and crowded teeth in general, it is acknowledged

that they decay and perish sooner than even and regular teeth. This must be partly due to the mechanical difficulty in keeping them clean; but also in part, I fancy, to the fact that they are in themselves more perishable. In my opinion the two principal reasons for the irregular and perishable teeth of our children are (1) sending them to school too early, and (2) feeding them improperly. As to the latter cause, so much has been said and written that I need not take up your time to enlarge upon it. To take a familiar example, let it suffice to say that the children must have phosphates. Baron Liebig says that one thousand pounds of wheat contains twenty-one pounds of phosphates, and one thousand pounds of white flour contains five-and-a-half pounds of phosphates. In other words, by our absurdly wasteful process of preparing flour, we have removed about three-fourths of the bone, tooth, nerve, and brain food from our children's bread.

I will fortify my second assertion by quoting Dr. Kingsley, who says, "The primary cause, so far as the individual is concerned, of any general disturbance in the development of the permanent teeth showing itself, particularly in their malposition, is directly traceable to a lesion of or enervation of the trigeminus nerve; that it is an interference, more or less prolonged, with one of the prominent functions of that nerve, and operating at its origin. The function of the trigeminus, thus stimulated or interrupted, is that which supports, regulates, and governs the nutrition of the tissues to which its terminal branches are distributed."

Professor Austin said, in one of his lectures on the fifth nerve, "The nervous centre in which the trigeminus is implanted is of all nervous centres the one which, in the human subject, is most liable to congenital imperfection of the kind which necessitates a break-down in its governing functions at a special crisis in the development of the organism."

From the Boston Medical and Surgical Journal of June 3, 1886, I clip the following: "Among the hard-worked pupils of the Paris public schools the teeth become deteriorated in a few weeks after entry. The second dentition is often premature," etc. Dr. J. L. Williams has shown the evil effects of any mental strain upon the teeth, both in increased sensibility and more rapid decay. Dr. D. M. Parker says that these same changes are always apparent in men who are training for athletic contests. Mr. Hutchinson, in his lectures on the pedigree of disease, says that, "In the discussion on rickets which took place in the Pathological Society of London two years ago, several speakers drew attention to the fact that this

disease is very rare in sunny climates, although infant inanition from poor food may be common." We may certainly believe it probable that our climate and the narrow, sunless streets of our large towns take their share in the production of what was once known on the Continent as the English disease." In other words, the mal-assimilation caused by impure air, confinement, and want of sunlight, as well as poor regimen, produces a disease, one of whose most pronounced characteristics is interference with dentition.

The American school system too often turns out a fairly proficient student, whose education is indeed an expensive if not a useless luxury, since his health has been seriously impaired. The integrity of his most precious organs, including his teeth, have been sacrificed. He has already an assortment of neuralgias, dyspepsias, lumbagos, and headaches,—why? In great measure because his education was forced and his health neglected years ago. Day says, in his admirable work on headaches, "I think that the period of the second dentition is the earliest period when instruction requiring brain-work can be safely pushed. The period of the second dentition must be reckoned the most important period of childhood, from a developmental point of view. They (the people who would force education) indicate a grievous lack of capacity to comprehend the fragility of a structure which is incapable of bearing any additional burden."

By the English factory laws the development of the teeth is taken as the best standard of physical capability, and as a more reliable test of age than height, because it is well known that the tallest children are generally the most weak and fragile.

Gentlemen, this is too important a subject properly to be set forth in the time allotted to me. However, I cannot for a moment doubt that much of the nervousness of Americans depends upon faulty digestion, and that this primarily depends upon poor teeth and want of exercise and fresh air.

A recent writer, high in authority, says that the loss of the teeth is a frequent cause in the aged of rheumatoid arthritis of the tempero-maxillary articulation. The inference is of course that false teeth, by preserving the shape of the jaw and preventing muscular atrophy, would obviate the tendency to this complaint, the consequences of which are very inconvenient and often serious.

It is possible that conservatism is now being carried somewhat too far in dentistry as well as in general surgery. Nevertheless, our greatly increased knowledge of fermentative micro-organisms has given us a correspondingly increased range of choice. As surgeons we do

not fear, as our predecessors did, that our patient's life may be sacrificed in trying to save a limb,—because we can tell much more closely his chances of recovery with or without an operation. In like manner you can often choose whether a tooth shall be preserved that would in former years certainly have been sacrificed. Before dentistry had reached its present high level, bad teeth were not in such inexcusably bad form as they are at present.

Admitting the deterioration of mankind physically, it is known that he is longer-lived now than ever. A great part of the credit for this must certainly be given to the dentist. We must in fairness acknowledge that dentistry has conferred upon mankind benefits whose magnitude is beyond our powers of comprehension.

As one of your writers has said, a true view of a dentist's duty to his patient makes that duty begin and end with life itself.

A SUGGESTION.

BY THEODORE F. CHUPEIN, D.D.S., PHILADELPHIA.

The following suggestion regarding natural tooth crown substitutes may meet an emergency in some cases. The idea occurred to me, but I have not had a case thus far to test its feasibility. I term it the "natural crown," as it is made from the crown of a natural human tooth. It sometimes happens that good teeth are extracted, which are free from any trace of decay, to relieve a crowded condition of the dental arch; but even should the crowns be decayed, either slightly or extensively, this will be no impediment to the operation, as the decayed places may be filled or contoured either with gold or amalgam, and serve as substitutes for lost tooth crowns.

For facility of description we will take a typical case,—an upper molar. The remains of the crown are filed or ground down flat or level, a little above the margin of the gum. The roots are seamed out, treated and filled, and the pulp-chamber prepared as shown at Fig. 1. The crown of an upper molar, of the proper size and side, is selected, filled, and contoured in its decayed places, if the selected tooth has decayed places, and sawed off at its neck. The pulp-chamber of the crown is likewise prepared by properly seaming and undercutting with suitable engine-burrs.

Such of the natural teeth as come into our hands by extractions should be kept submerged in strong brine, or perhaps preferably in a jar of alcohol. If permitted to become dry after extraction, they get so brittle that little can be done with them in cutting, scraping, or seaming them for filling.

When the root and crown are prepared, as described, the pulpchamber in the crown is filled with wax, so that a little of the wax protrudes from it, sufficient to fill the pulp-chamber in the root. With the help of the wax to hold the crown in position the crown may be properly articulated by grinding away with corundum wheels in the engine, at such points as are indicated by the occlusion. This being accomplished, the crown is filed down at its neck, about the thickness of cardboard, for a trifle more, for reasons that will become apparent. A piece of eighteen carat gold plate, about twenty-eight or thirty gauge thickness, and of a size that will amply cover the neck of the crown is punched or drilled at points about one-thirty-second of an inch apart, as

piece of wire, bent like a staple, is passed through these holes and soldered to the plate, with two minute pieces of solder just sufficient to fill the countersunk holes, the protruding ends of the wire are bent so as to form another staple on the other side

of the plate, and soldered also, as shown at Fig. 3. The

shown at Fig. 2. These holes are then countersunk. A

Fig. 3. plate, as thus constructed, is filed to the proper size, as indicated by the size of the neck of the crown or root. The root is now well dried, and the proper provisions made for the exclusion of moisture. The pulp-chamber of the root is filled with zinc, phosphate, cement, and a little of the same placed within the loop on the plate. The plate is then placed on the root and kept in close contact and proper position, until the cement hardens. The pulpchamber, in the crown, is then filled with cement, and a little placed within the loop on the plate, when it is carried to its position. After

the cement has set, the operation is completed by scraping off such small portions of the cement as may have oozed through between the root and plate and between the crown and plate. There is nothing to show that this substitute differs from a natural toothcrown except the line of the gold showing the plate which binds the two parts together, as at Fig. 4. The dotted lines indicate the staples on the plate within the pulp-chamber.





PREPARATION AND FILLING OF ROOT CANALS.1

BY G. F. ROOT, D.D.S., PHILADELPHIA.

In presenting the subject I will commence with the devitalization and removal of a living pulp, as that is about the first step in the preparation of a root canal. There are several ways of obtaining the desired result, but I shall mention only two, as they are the principal methods now in use. I refer to escharotic agents and mechanical extirpation.

The latter is an operation that presents numerous difficulties and objections, owing principally to the reluctance of patients to stand the pain, and the inability in many cases of obtaining free access to the canals. To perform the operation, first obtain a free opening to the canal, and then, by passing a broach with a sharp barb quickly to the apex, between the pulp and tooth, rotate several times, whereupon the pulp can be withdrawn. It is an operation that should not be performed except in extreme cases, such as lack of time, or where we have a pulp more or less benumbed or deadened to pain. There is another way advocated by some operators, who claim almost no pain in its performance. This is done by sharpening a stick of wood to as near the size of the canal as can be judged, and, after dipping it in carbolic acid and having the pulp freely exposed, drive the peg of wood through the tissues of the pulp into the canal with a sharp blow of the mallet; and when the peg is withdrawn the pulp comes away with it, or, if it should not, it can easily be removed with a broach. I have never tried this method, and therefore cannot speak from experience; but should think, even leaving out of the question the fact of the fearful pain it must necessarily cause, the impossibility of forming the peg to the proper size, and the possibility of a crooked canal, would deter most careful operators from trying the experiment.

Operations should be performed with the very smallest amount of pain possible to the patient, and I therefore oppose anything like extirpation, except, as I have said before, in extreme cases. Most patients will willingly give time to save pain; and although the devitalization of a pulp is not performed with entire freedom from pain, yet there is a vast difference in the amount of pain endured

¹ Read at the twenty-first annual meeting of the Pennsylvania State Society, Cresson, Pennsylvania, July 30, 1889.

in performing the two operations. Arsenic is the escharotic agent generally used, in combination often with some other drug or chemical, to alleviate the pain usually caused. There are other escharotic agents that are sometimes used, but as arsenic is the quickest I will confine my remarks to that alone. I have tried several obtundents in connection with the arsenic, but have had more success with arsenic and sulphate of morphia (equal parts) than with any other preparation. I have used Dr. Kirk's preparation of cocaine in combination with the arsenic, but had comparatively little success with it, as it did not appear to alleviate the pain any more than morphia. However, there is nothing, so far as I know, that will give entire freedom from the pain caused by the arsenic.

It is important, before applying the drug, to reduce as far as possible the irritated condition usually found when first we see the case. One application usually is all that is required, but sometimes it is necessary to make several before devitalization is complete. I generally allow from twenty-four to seventy-two hours for the first application to take effect. If within the course of twenty-four hours the patient should have severe pain, lasting two or three hours, the pulp can be removed at the end of the first twenty-four hours, with but very little pain; but if there should be no complaint of severe toothache, it will usually take the full seventy-two hours for the devitalization to be complete, and frequently it will require one or more applications of arsenic. Of course, it is not absolutely necessary to have pain in a tooth before devitalization takes place, but in a large majority of cases you will find there has been more or less pain before the pulp dies. Very often the pulp will be only partially dead, sometimes in one of the roots of a tooth and not in others; or it may die only part way down the canal. In such cases I remove the dead portion, stop any hemorrhage that may occur, and reapply arsenic; and so on at each sitting until satisfied I have removed all the pulp. I have found Donaldson's nerve-broaches or bristles the best instruments to remove pulps by running them down the canal between the pulp and the tooth to the apex, the same as in extirpation, only we do not have to be so quick, and then by twisting several times the barbs will become entwined in the pulp-tissue and can readily be removed, unless, as we sometimes find, the pulp is very much softened and disintegrated, and we have to remove it piecemeal; in such cases it is all-important to remove all the pulp, or else we are sure to have trouble after the tooth is filled; in such cases, after all the pulp possible is removed with the bristles, I usually wipe the canal out several times with cotton entwined on a fine broach saturated in carbolic acid, care being taken not to force any débris through the apical foramen; the small particles that will not come away with the bristle will cling to the cotton and be withdrawn with it, thus leaving very little chance for any to remain in the canal. After we are satisfied we have a clean canal, and it is ready for filling, we are confronted with the question, Shall we fill at once? We will of course have to be governed very much by circumstances, but I believe that, with very few exceptions, it is far better to insert an antiseptic dressing in the canal, and leave for a day or two, than to fill immediately, for the reason that usually there is more or less hemorrhage which it is almost impossible to stop at once, and also that very often we have more or less irritation at the apex due to the use of the arsenic, thus lessening the chances for success. usually use carbolic acid on cotton for the dressing, as it not only answers the purpose of an antiseptic, but through its coagulating power stops any hemorrhage that may occur. An application of iodine and tincture of aconite root, equal parts, over the gum, will usually stop any irritation at the end of the root.

We meet another class of teeth,—those in which the pulps are dead; and of these several different kinds, one in which the pulp has been dead for some time without giving any sign of trouble, another in which there is some congestion and irritation at the apex, and others in which we have an abscess to contend with; but the preparation of the canal in all of these cases amounts to the same thing, so I will consider them all under one method of treatment. After the canal has been freely exposed, if the pulp is not softened and broken up, it can easily be removed by using the same means previously spoken of, care being taken not to force any putrescent matter through the apex in inserting the instrument; but in case the pulp is softened and broken down, and we find nothing but pus and putrefied matter, I first take some absorbent cotton or bibulous paper on a broach and absorb all the fluid possible; then with a broach remove all the débris, using the same care as before in regard to forcing anything through the apex. I then insert a shred of cotton, saturated in carbolic acid, loosely in the canal, and seal with cotton alone, in order to give free outlet to any gases that may be formed; at the next sitting, after removing the dressing, I syringe well with tepid water, and, after drying well, inject peroxide of hydrogen freely into the canal with cotton on a broach; again dry and inject bichloride of mercury solution (one to five hundred); dry again and insert eotton saturated in carbolic acid, this latter to keep the canal sweet and clean until the next sitting. I thus treat the canal several times, until there are no signs of pus or any offensive odor, and then it is ready for filling.

The bichloride of mercury is the best antiseptic, and I believe it is the strongest known; it is to be used with care, owing to its being such a deadly poison. I believe I have had more success with this method than with any other I have used, and would strongly recommend those who have never used it to give it a good trial, and I feel sure it will give satisfaction.

Where I find a canal too small for a broach, I generally enlarge it with a canal-drill, commencing with a small size and then a larger one, and so on; considerable care is required to prevent drilling through the wall of the tooth, but only in such cases where there is a small canal do I think it at all necessary to use a drill.

When the canal is ready for filling, the question arises, What shall we fill with? Gold? No: as it is a waste of time and labor; other filling-materials answer the same purpose, and are easier of manipulation. Amalgam? No: as there is some liability of its discoloring the tooth. We now have left three materials that are almost in universal use, -oxychloride of zinc, gutta-percha, and plain cotton. There is no doubt but what the first-named would make by far the best material for the purpose, if it were not for there being a chance of future trouble at the end of the root, no matter how careful we are in our treatment. I do not believe we can be positive of success, for with all our care it is just possible that a small amount of decayed tissue may be left in the canal, and a very small particle would cause a mountain of trouble; therefore I do not think it advisable to fill with the cement, at least at first, owing to the extreme difficulty of removing if necessary. I would use either gutta-percha or the cotton for about one year, or as long as a good cement filling would last, and at the end of that time, if there was no sign of trouble, and on removing the filling I found no trace of putrescent matter, I might then fill with oxychloride with safety.

To fill with gutta-percha, I dissolve some of the material in chloroform to about the consistency of cream, and then with a broach work a little into the canal, and then take one of those points made for the purpose, and insert in the canal as far as the apex. If care is taken not to get too much of the liquid gutta-percha in the canal, and it is not too thin, there is very little danger of forcing any through the foramen; and even if a small portion should go through, I do not think it would cause any trouble. I have also

had success in filling with cotton. I take a shred of cotton and roll tightly with my fingers; then, dipping it in carbolic acid, carry it to the apex with a smooth broach and pack in firmly; this makes about as reliable a filling as any; and although there are failures reported, I believe, if the truth be known, not more than with the other materials.

I am sorry that I cannot offer the profession some material that will combine the good qualities of all I have mentioned, leaving out the bad; but I hope that some member will conceive of something before long that will answer the same purpose.

DENTAL LITERATURE,1

BY A. G. BENNETT, D.D.S., FLUSHING, N. Y.

Your attention is this evening directed to a subject that I presume must be interesting to every lover of his profession. The time and place seem eminently fitting for its presentation and discussion. Modern dental literature is now about fifty years old; the college, the society, and the journal having been founded, organized, and established respectively at about the same time. This city is the dental centre in respect to the number of able and active men, if not as to colleges and journals, and this society is one of the two strongest and most influential organizations in the production of theoretical and practical literature.

I appear before you as one who can testify to the benefits of our literature before attending college or society meetings as well as afterwards, and I take this occasion to express my appreciation of the work you have done in this direction; for many of you I have long known as the authors of valuable contributions, and the participants in interesting discussions, to the benefit of our noble profession.

Even a brief paper on this subject would seem incomplete without some mention of our most advanced thinkers, such as Black and Miller, not to name others; but I have attempted simply to lay the ground-work of the subject, depending on those of you of larger experience to rear the superstructure. With a view to completeness,

¹ Read before the First District Dental Society of the State of New York, January 8, 1889.

so far as I go, I have been at times perhaps too elementary, and at others have not escaped the commonplace. Nor would I appear to be magnifying the importance of the periodical; for I am inclined to think that if all dentists were educated as well as they should be, half our present literature as found in the journals would be useless.—would never have existed.

It will be noted that I have illustrated some points and principles, not by absurd or exceptional examples, but by those that may justly be regarded as extreme, and therefore all the more striking.

Dental literature as found in the text-books and journals is a branch of that great department of scientific thought which treats of the diseases of the general system as well as their remedies. It is so intimately connected with preliminary training and subsequent association that its relation to these must first be outlined in a general way. A dental, like a medical, education is the result of three forces or factors: the college, the society, and the journal; and, like a medical education, instead of ending with the commencement, it properly but fairly begins on that eventful day. When the ground-work is laid by the college, the society and the journal and that familiar factor known as experience must be depended on to complete the educational superstructure.

The College. - In more senses than one the college is the vestibule to the professional temple, which, in its greater light, gives scope to broader and clearer vision. Far be it from any lover of his profession to belittle the college, even though it does prove to some the "royal road" that leads to learning without labor; or that "other way" through which some climb to a profession, without such credentials as should be required in this enlightened age. It is trite but true that all real progress begins at the beginning, and continues to proceed, if at all, in accordance with the nature of things and in harmony with the constitution of the mind; and I presume all will admit that vigorous growth and professional progress depend almost entirely on the standards of admission and graduation maintained at the colleges. If these, in their struggle for existence on a business basis, cannot gradually elevate their standards, our investigators and authors labor at a great disadvantage, if not in vain, to enlighten their routinist who looks back on commencement-day as the climax of his mental growth; for it must be conceded that the more thorough the college course, the higher must be the quality of the literature that will be demanded, and, conversely, the lower the standard of admission and graduation, the poorer the quality of our periodicals and the smaller the

demand for literature of any kind. The teacher, it has been said, cannot furnish "ready-made" experience, though it is a part of his vocation to reduce for the student the number of lessons that must be learned in that hard school.

Some minds—those that are turned to the light—continue to grow even under the most unfavorable circumstances, others—those who do not have the same affinity for knowledge after a certain period—cease to acquire, and begin to narrow. The one ascends the heights of a broader culture, the other descends into the chill valley of apathetic indifference. The mind that shuts out the light seems to wither rather than to ripen, "but the education of a man of open mind is never ended."

The Society.—What is the meaning and value of the society but an organized effort for common improvement? The social feature aside, the object and outcome of such meetings as this is the reading and discussion of papers and the interchange of experience,—in a word, the production of literature. Between the pressure of daily practice and the need of rest, the active members of our societies do much good work. And though the State and national gatherings are, and perhaps must be, in the languid summer vacation, the papers at least give value and interest to some of our leading periodicals. Besides this, the society is in striking contrast to the ancient closeness and narrowness that have not even yet entirely disappeared.

The Journal.—The journal is the pioneer of research and investigation, and the transcript of experience. The great and most obvious advantage of all recorded thought is that it removes the barriers of time and space, and brings within our reach all that is most valuable and helpful in the past and the present.

Ever since the days of Bacon, if not long before, the thinkers have partially or entirely turned their attention from the mere appearances of things and have been examining the compositions of organisms and the laws that govern their functions, as well as the causes and remedies for all abnormal conditions. And whilst, on the one hand, such progress has been made that the laity are often led to think that science can settle all things, even to the origin and destiny of man; on the other hand, it must be conceded by the most advanced that very little seems finally or definitely settled. As a proof of this, in dental science itself, the past progress and the present condition of histology need but be mentioned, though without presuming an opinion on its most recent outcome. It has been aptly said that man studies nature, not for the intrinsic value of the

knowledge itself, nor for its effect on his mind, but solely for practical purposes. It is not so much that nature wars against man that her forces must be brought under control and guidance, but that the conditions of human life may be made better, the grand end and aim being to make nature the servant of man,—to improve the planet we dwell on, the "house" we dwell in, and thus make life more and more worth the living. And at the very basis of this great work dental science and art find their proper sphere and important position.

The result of nearly all the discoveries in scientific investigation find expression first in the journals.

In general it may be said that the modern periodical is, next to the school, the chief factor and the central feature of progress in all directions. In view of the fact that the humblest pursuits and industries have their periodicals, it seems almost needless that attention should be called to the value and importance of the literature of any profession. It may be claimed that dentistry is largely an art, and that it has been and is still practised as a trade, and that even as a profession it is slightly surgical and largely mechanical; yet the fact remains that the dentist is much more than an educated mechanic; and though he may and should accomplish much in his laboratory, he cannot dispense with his library any more than a physician. The gifted few may depend on their own resources, but the majority must depend largely on the experience of others.

The ideal dentist is a man of thought and action combined. The thoughtless routinist becomes a mere business machine, or, like many an artisan, a part of the machinery he operates. And even the true professional man who has not the leisure for thinking cannot expect much growth. But, as the name implies, the doctor must be a teacher, one who studies that he may give the best instruction to those who seek his services, and that he may be able to reduce to practice his acquirements.

The dental journal should contain not only the best and latest thought of the profession, but at once the most accessible, the most economical, and the most universal means of professional advancement. And though the mission of the journal is to expound principles, discuss methods, and record experience, it must, since it deals in the new and recent, contain considerable of the speculative and the theoretical. But since a theory is merely a temporary principle, as many a conclusion is merely a temporary resting-place, the so-called practical man must admit the value of whatever is

still subject to the tests of criticism and experience. No matter how thorough the colleges may become, the fact remains that dental literature as found in the journals is the chief factor of post-graduate education. Hence the essential need of able writers and studious readers. Again, the literature that grows in the journals becomes gradually crystallized into text-books, which in turn become the standards by which the later productions are judged.

It is not the number but the ability of writers that gives value to any and all kinds of literature, especially that of a scientific nature. Some questions seem always open. For example, Dr. Dean, in a recent paper, proceeds to show that all dental legislation springs from mere selfishness, and is solely for the benefit of those in possession of the professional demesne. However debatable this may be, there is no disputing the fact that the chief factor in all progress is interchange of thought. Hence the importance of its quality.

Dr. Faught, in a paper devoted chiefly to the statistics of literature as represented in one journal (the Cosmos), points out the fact that the majority of our writers are or have been connected with the colleges. Why not? The atmosphere of a college is or should be somewhat electrified by scientific thought. There is certainly little in the office, especially in that of a semi-educated man engaged all day in drilling and filling semi-vital organs, to inspire or compel mental activity. Besides, this pursuit is too exhausting. But the college-man is forced to think, and to learn the art of expression, and to have some meaning and method in his discourses. This is true generally, but does not often apply to the professor who from a pressure of practice rushes in at the last moment and rambles all around and over his theme, under the pleasing delusion that the students do not know the difference between a diluted muddle and a solid and systematic effort, with a beginning, a middle, and an end. In the paper just referred to the writer mentions the fact that for almost ten years there were only ten writers from what he calls the ranks, which would indicate dulness or indifference there, or that most of the ability is in the colleges, both of which points are quite debatable. These "ten righteous" may be a discreditably small number, but if they are writers of the first order they should, even now, be able to save the profession from the danger of being inundated by the annual outpouring of new-recruits.

1. The Writer.—As already implied, the colleges must train our thinkers as well as do no small part of our thinking, there being no good reason why their direct influence should cease with the

commencement. But the nature of dental art is such that all our thinkers need not be writers. The man with a genius for invention and a talent for the artistic will find full scope for his best endeavors. Some can best express themselves by the product of their hands, an art that cannot be well taught by words, and one that is, after all, the most effective means of expressing an idea. How important it is to possess that artistic sense, and perceive truly the meaning of form, which is said to hold a middle place between matter and mind, moulding the one and expressing the other! And instances are not wanting when the original work of one can be best expressed in the words of another. Emerson says, "Each man of thought is surrounded by wiser men than he, if they cannot write as well. Why cannot he and they combine?" Again, the compiler is one of the most useful writers in every department of knowledge. Next to the investigators who work and write largely for the most advanced, we as a profession need men who have the faculty and industry to write clear, concise, and systematic summaries of our annual progress in every direction. And if an editor can give the essence of some controverted point or subject every few months, so much the better for all concerned. Why the compiler is needed in dentistry ought to be obvious enough. The practice of dentistry is so exacting and exhausting that the busy or weary man must often take his reading in a condensed form; and the lazy man takes his in that shape or not at all. And, in general, the pressure and haste of modern life demand that the attention be not unduly taxed by mere phrases or a vain parade of words, that serve only to conceal poverty of thought. Again, in the course of time ideas and theories and devices that filled much space in journals and books are compressed into a few paragraphs or sentences, and even into clauses and words. Were it otherwise, practical professional literature would be buried beneath a mass of mere verbiage, and become inaccessible to the many who need it most. Besides, after becoming more or less familiar with the ideas that belong to any subject, the discriminating reader seeks their best form, their most classical expression. But an article or a book on a new subject must be something more than a list of practical methods. This applies particularly to any subject that has not passed the stage of controversy. The principles or the theory at least should be laid down in clear and systematic outline. Something more than mere dogmatism must be demanded, or the writer must not be surprised at the stereotyped reply, "I don't believe in it; it is all wrong." Since methods occupy so much space in dental literature, good descriptive writers are always in demand. One who can by a suggestive word or a felicitous phrase make things "live in description" has a kind of genius that always will be appreciated. And he who can embody a thought in a striking figure of speech has the most effective means of arresting attention and exciting interest. But it is not claimed that a complicated subject can be made clear and simple, even by the most expert writer, without the reader's giving the aid of his thinking.

It may be asked here, What are the claims of style in scientific writing, which primarily aims simply at precision and clearness? It is trite to say that style is dress, but it is more; it is manner, which counts for almost everything. That it has some claims no one can deny. The cultivated must not be repelled, and the semieducated must be attracted; for even those who have the most intense curiosity about things, scientific and artistic, are not proof against the effect of a loose, rambling style, that has neither meaning nor method. Scientific truth finds expression more frequently in an Emersonian simplicity than in an Addisonian elegance of diction. A harsh and halting style repels. Take this instance: A well-educated student was advised to read a certain section in a recent work on dentistry, and though the subject is one of the most absorbingly interesting and practical of all, the reader was repelled by the writer's labored efforts to present simple things in a learned style. Many readers have a similar experience, without perhaps being able to name the cause. A bad style is a worse nonconductor between the writer and the reader than a manuscript is between a speaker and his audience. Some things do not always get a hearing as soon as might be expected. May not this be owing. in part at least, to the manner of their presentation? Again, points that are suggestive, that awaken thought, are often much more valuable than many of the so-called practical points that give no hint of the why and when.

A slight acquaintance at least with the masters of thought and expression will not detract from one's ability as a filler of teeth. The reader may not be impressed with the simple majesty of Milton, and he may be repelled by the pompous dignity of Johnson; he must, however, be blind indeed if he misses the terse force compressed into the metrical essays of Pope. If he seeks the master in the art of expression, he can find none so clear and forcible as to details, none so comprehensive as to generalities, as Herbert Spencer. This writer takes the world of mind and matter for his province, and no subject is so profound or so complex as to

elude his broad philosophic insight or interfere with a vigorous and systematic exposition. He has that rare combination of a good command of language and a better command of ideas.

The Reader.—Burke says, "He that borrows the aid of an equal understanding doubles his own." However that may be, it seems to me that a man may better be known by the books he reads than by the company he keeps, for the obvious reason that the choice of the former is always free.

In order that we know more and do better, we must have good writers; but what we need most of all is a larger number of studious readers. It is of course assumed that the colleges develop that degree of intelligence which is needful to understand and appreciate the best literature. Reading alone will not suffice; but given a better training, it is claimed that more persistent efforts at self-improvement will greatly reduce the difference that exists to-day between the routinist who reads little and thinks less, and the progressive practitioner who, though he may not be original in any direction, is well-read in every branch of his profession. But what of the man who has never seen a college? Enforce the laws, and by and by that question will answer itself.

We may need better journals, but create a demand for a higher literature and the supply will take care of itself. According to some statistics, already referred to, furnished by Dr. Faught, it seems that in almost ten years—1872 to 1881—ten writers did nearly all the literary work in the Cosmos outside of the colleges, which mustered about fifteen in the same period. It seems to me that there are more significant statistics, though perhaps more difficult to obtain. For instance, this is a pertinent point: How many dentists made our literature a study? Of these, how many are graduates? How many men at the end of each year will stand a good examination on all that has any value in the new books and two or three of the best journals? These questions may be more suggestive than answerable, but I think them quite pertinent.

When we have enough studious readers, our journals need not be published at the depots. Given the readers, a journal published by dentists and for dentists never need "perish from the earth." Yet a journal may die because it is too good to live, or fails to strike the average intelligence. But we do not begin at the beginning. Dental history is not taught in the colleges, and the periodicals are only incidentally mentioned. The college instructor who boasted of the schools he attended, and sneered at those who write for the journals, but who neither wrote, nor perhaps read, may

fitly represent the semi-educated man who thinks the text-books of some years ago final and all-sufficient.

Bacon's familiar saying, to the effect that reading, talking, and writing will make respectively a full, ready, and exact man, is in point. This is made complete by Hobbs's saying that if he read as much, and thought as little, as some of his friends, he would be as ignorant as they. Reading alone is certain to produce congestion of ideas, but thinking, talking, and writing result in perfect assimilation.

What, then, constitutes the ideal reader? He whose training has given him the key to art, science, literature, and philosophy.

Dental literature, like all that is scientific, requires that the reader give the assistance of his thinking to what he reads; for, says Dr. Mitchell, the best readers are, in a measure, co-operative authors, and may be left to interpolate the unsaid. It has been well stated that it is an interesting problem for a man to solve, how far he shall profit by the thoughts of other men and not be enslaved by them. Can it be that the fear of being enslaved keeps down the subscription-lists of our journals? I hope not. Only the few great minds of our race, -those that have been illumined by a spark of that immortal fire called genius, -only these can create a world of thought that is all their own. Yet even these must have their materials, which must be gathered by more tangible means than inspiration. An English essayist says that each one, as he steps on the stage of action, has placed at his disposal the accumulated mental capital of the ages. Yet in one sense this capital is stored in mines and cannot come into his possession except at the cost of much labor. The fields of thought are sown, but each must reap and garner the harvest for himself.

The same writer says that what a man has learned is of importance, but what he is, what he can do, what he will become, are more significant things. Reading, as well as thinking, to have any value, must be undertaken with a definite object and with studious care. That "definite object" means self-improvement, and it should also mean aid to others. One who reads carefully and takes notes, and then amplifies them so that they have meaning and method, has done much to fix what may have been a cloudy subject clearly in his mind. And if he tries to gather the real gist from a prolix or diffuse writer, or from one who still retains his sophomoric floridity of diction, he will be surprised at the small amount of wheat buried under the mountains of chaff. A man need not write for print alone, but to review his knowledge and to fix it firmly in his mind;

for a man's learning that is not in constant use never seems so little as when he draws his pen for a grand review on paper. He is surprised at the "absentees" and the straggling appearance his ideas make when they answer to the mental roll-call. A practical point here is that papers to be discussed at society meetings should be announced always a month in advance, in order that each can so prepare as to elevate this kind of literature.

How much failure is directly due to the lack of what one could readily learn from books and journals is one of those questions that is more suggestive than answerable. Let me give you two significant instances from general and special surgery, which is the most tangible branch of practice. The most marked advance in modern surgery has been made by antiseptics introduced twenty-five years ago by Professor Lister. Just previously, this distinguished surgeon had lost, during three years, about forty-five per cent. of his cases, chiefly from septic diseases. During the next three years, while his methods were still crude, the mortality fell to fifteen per cent. Having perfected his system, he treated during sixteen years five hundred and fifty-three grave surgical cases, with a mortality from septic disease of only one-third of one per cent. This was all done by the same man, for same kind of injuries, in same class of patients. Professor Lister and his colleague, Mr. Spence, who declined to use antiseptics, worked in this same London hospital, and the results show that Spence lost three times as many patients as Lister, while the deaths from infective diseases were eight times greater among the patients of the former than among those of the latter. More striking records than these could be given, but this will suffice. Such and so great is the difference between the progressive and conservative practitioner, between the man whose mind is always open and turned to the light, and the man who follows the old ways, as if all were known, or nothing more was needed.

Take an instance from practical dentistry. In the Cosmos for August, 1884, Dr. Atkinson gives the case of an abscess which, before coming into his hands, had been under treatment for five years, and almost all this time by the same dentist. It was an ordinary abscess on an upper incisor, and hence within easy reach; the methods used—that of opening through the tooth and process with a drill and applying peroxide of hydrogen—were known, at least, to all progressive men, and could have been known and applied by the dentist who first had charge of the case. The doctor had not only the chronic abscess to treat, but had to counteract much overtreatment. Here

is food for thought. What are the lessons? As Dr. Atkinson suggests, they are briefly these: first, attend society meetings and consult with others of more experience; second, know the how and why of what you are doing; third, trust to nature more and overtreat less; fourth, practise less in a commercial and more in a professional sense.

When any operation, especially a difficult, doubtful or unusual one, is performed, it is well to ask this question, Is this the best as to principle, method, or remedy that modern dentistry can do for this case? This may not at once make one more skilful, but it will awaken thought, and invite comparison that may not always be very flattering.

The Critic.—The proper function of the critic is to weigh evidence and to establish truth. Of critics in general it may be said that not being of an investigating or inventive turn of mind, they study the works of others, in order to determine the intrinsic value and actual utility of all that constitutes the fund of knowledge in any branch of learning. It is true that, strictly speaking, we have no class of men who specially attend to this kind of work; yet every true student of science is in some sense a critic.

It would seem that if critics are needed in the sphere of taste, which within certain limits is always changing, how much more are they required in matters of fact and questions of science, which are fixed and final! Any one can suggest a doubt or raise an objection; he alone is the true critic who, while perceiving imperfections, can remove them or indicate a remedy. The mere faultfinder becomes captious and querulous, and the partisan becomes personal. Any profession that depends on science as a basis must hold its investigators to strict account, since, from the nature of things, but few can verify or disprove their supposed facts or alleged principles. Two little questions cover the ground: Is it true? as to science. Is it practical? as to art. What if some subjects of no mean calibre, when exposed to scientific tests, present almost microscopic dimensions, or that others, that met with a cold reception, grow rather than shrink under discussion. It is safe to say that no idea or device of real value was ever yet forced from the field by intolerant criticism. Every new thing must be closely scrutinized and may be even sharply criticised; yet, it may be justly asked by what standard is a new system or appliance to be judged? Certainly not entirely by experience; nor is it to be accepted or rejected on general principles or abstract reasoning. It is related of the distinguished inventor, Sir Joseph Whitworth, that

when anything new occurred to or was shown him, he did not proceed to argue one way or the other, but always said, "Let us try it." Many a reputation for sagacity is often risked, and frequently lost, because new ideas and devices of any value persist in having their claims allowed, and insist on having a future. It is well to note in passing that we generally judge new things by old and fixed standards which often have taken a long time to adjust.

There are two elements, the progressive and the conservative, that are always contending for the mastery, both of which are essential to substantial progress. The observing and inventive mind sees too much imperfection to be satisfied with present attainments; the conservative who has ceased to acquire has not the attitude of mind to inspect the new or re-examine familiar things that he has long regarded as fixed and permanent. The progressive man sighs for new kingdoms to conquer; the conservative seems to be satisfied, apparently because he has possession of the field. The progressive man; dazzled by the promise of the present, fails to profit by the lessons of experience; the conservative naturally clings to the past, and, along with much of value, retains many mildewed ideas that have perhaps served as stepping-stones here and there in the paths of progress. In the youthful mind, "too inexperienced to reason, too buoyant to doubt," the new idea finds a fertile soil that produces rapid growth; in the old the soil is more or less barren, and ideas take root slowly. But matters of opinion are largely points of view, and changing this seems to be a difficult matter, even with the most enlightened. Some seem by their attitude to say, "We have enough, there can be nothing new." We have, however, no fear of a limit being set to scientific progress.

I will close by quoting what I consider one of the soundest axioms in dental literature and practice, and to emphasize the necessity of looking at both sides of a subject: "The operator must be guided by a judgment based, not on the questionable work of one, but on the carefully collated knowledge of many."

Reports of Society Meetings.

PENNSYLVANIA STATE DENTAL SOCIETY.—(Continued.)

THE USE OF THE MATRIX WITH PROXIMAL AMALGAM FILLINGS.

BY F. S. BASSETT, D.D.S., PHILADELPHIA.

For many years various forms of matrix have been used to facilitate the introduction of gold into proximate cavities, and recently its use has become somewhat more extended in connection with amalgam in similar places. With the hope of inducing still more of the profession to adopt this plan, I bring this subject before you, feeling assured that, as with myself, its use will be attended with great satisfaction. Some may question the advisability of consuming any time for the purpose of fixing a matrix for so short an operation as filling a cavity with amalgam, but with me the advantages have been so great that I almost always use the matrix for proximate fillings. I question, however, whether any time is really lost by fixing a matrix, even for fillings of ordinary difficulty; and in very extensive cavities, reaching to or beyond the gum, much time is certainly gained by this method.

An examination of the proximate amalgam fillings which come under our notice is apt to reveal two general defects,—an insufficiency of contour, and an excess of filling at the cervical border. I am an earnest advocate of restoring normal contour to all teeth which require filling upon their proximate surfaces, for my observations have proven to me most conclusively that such teeth are far less liable to recurring decay than if left with flat surfaces. In addition, there is the greater stability to the whole arch, to say nothing of the greater comfort to the patient. Of all uncomfortable conditions to which the teeth are at times subjected, I know of none greater than when amalgam fillings project beyond the cervical border of a proximate cavity. Such places afford a convenient pocket for the lodgement of particles of food, which, if not soon removed, cause further decay at or below the border of the gum; and this is frequently not discovered until the pulp is nearly or quite exposed.

If attempts are made by the patient to remove the débris from such places, continued irritation to the gum is produced, and a great amount of discomfort occasioned. It was for the correction of this defect that I first began using the matrix, but the results obtained at other points of the filling have been so satisfactory that I now look upon it as a necessary aid to success in very difficult and extensive cavities.

Many forms of matrix have been devised, each having some particular claim to merit; but the form which I use is exceedingly simple, and answers the purpose perfectly. It consists of a piece of German-silver plate about one-thirtieth of an inch in thickness, cut and bent in the proper form for the case in hand. In an examination of the proximate surfaces of molars and bicuspids we usually find that the form of surface changes from convex upon the largest part of the crown to concave at or below the gum-line. Here arises the necessity for a matrix which can be readily adapted to the borders of the cavity, and also give the requisite contour to the filling. The German-silver matrix can be easily bent to fit any form of surface and yet is sufficiently rigid when wedged in place to bear all the pressure necessary for the introduction of the filling.

I will not dwell at any length in this paper on the necessity for the thorough preparation of the cavity, as it is well understood that to attain success thoroughness is as indispensable with amalgam as with gold. Particular attention must be given to bevelling the borders, since amalgam cannot be brought to a knife-edge as is often done with gold, for it will soon crack away and leave the filling imperfect. I usually try to shape the cavity so that the line of junction of tooth and filling will be at right-angles to the surface. Then there is the least danger of enamel and amalgam chipping away.

Before wedging the matrix in place the inner surface should be polished, which can be quickly done with pumice-powder upon a few fibres of cotton wound about a wooden mandrel in the engine hand-piece. The cases which are ordinarily the most difficult are by the use of the matrix reduced to simple cavities, which can be rapidly and accurately filled. With the amalgam mixed to a medium plastic condition, it can be pushed into all parts of the cavity with a firm pressure; and by making use of pellets of Japanese bibulous paper, as suggested by Dr. Bonwill, pressed firmly upon the surface of the amalgam it is packed into a homogeneous mass, and the surplus mercury brought to the surface, whence it can be

readily removed. After the cavity is filled and the matrix removed, the filling will be of the proper form without any concern as to the troublesome cervical edge, usually so difficult to shape accurately.

I invariably "finish" the filling at a subsequent sitting, after it has thoroughly bardened, much in the same manner as I finish a gold filling, with polishing tapes, powders, etc. The surface then remains in an agreeably smooth condition and the edges are brought out clearly and well-defined. The filling, then, besides serving in the highest degree the conservation of the tooth, has all the artistic excellence possible to attain. I fully believe that many extensive and difficult cavities in molars and even in bicuspids can be filled with more credit to the operator and satisfaction to the patient with amalgam than with gold. The great fatigue and possible prostration of long operations are thus avoided.

Another point in the consideration of the use of the matrix with proximate fillings of amalgam is that the rubber dam is seldom required. Even in mouths where the saliva is unusually abundant the cavity can be kept dry long enough to cover the whole surface with a layer of amalgam, after which the moisture will not seriously interfere with the successful completion of the operation.

DISCUSSION ON DR. F. S. BASSETT'S PAPER ON "THE USE OF THE MATRIX WITH PROXIMAL AMALGAM FILLINGS."

Dr. Jos. Head, Philadelphia.—Does Dr. Bassett ever put gold on top of the amalgam?

Dr. Frank S. Bassett.—I do not, but it is entirely feasible to do so. I do not combine the two metals, because I think the amalgam answers all necessary purposes, except in some places where the exposed part shows too much. Then a gold face would be good.

Dr. L. A. Faught, Philadelphia.—I am very much interested in the practice of using matrices in making proximal fillings of amalgam. I have lately begun their use in this relationship. I cannot say that I am successful in all instances, for I find that there are some difficulties at times. I have frequently found the matrix difficult to remove without detaching portions of the filling. It may be due to my faulty adjustment. I would like to ask the members regarding their experiences, for when I get my filling sufficiently hard, in removing the matrix I not unfrequently get into trouble. If I leave it soft I know I am in trouble. I also have a suspicion as to whether I do not drive the mercury into the edges of the filling. These are points of practical significance to us, and they are at present unsettled in my experience. I mention

them so as to start the ball of discussion going and to get practical experience.

Dr. F. S. Bassett, Philadelphia.—In reply to one objection of Dr. Faught's, that of displacing the filling in removing the matrix,—the thin German-silver matrix described can be bent into a straight piece, and pulled out sideways with pliers, without any injury to the filling. I have very little difficulty on that point, and if the matrix is wedged into position firmly, after removing your wedge, you have a little additional space for removing the matrix.

Regarding the fear of having a surplus accumulation of mercury along the edges and making the filling soft, I do not think there is any trouble, for it always seems to work to the surface for me. If it works out it is in globules, which leaves the edges hard.

Dr. F. H. Abel, Erie.—I have not had any trouble with the mercury in that way yet.

Dr. C. V. Kratzer, Reading.—Will Dr. Bassett mention whether he uses any particular matrix.

Dr. F. S. Bassett.—I make it for each particular case by using a piece of German-silver cut into the shape I want it.

Dr. C. V. Kratzer.—Is it retained without any appliances?

Dr. F. S. Bassett.—No; there must be something to wedge it in place. It is preferable to have enough space to contour readily.

Dr. G. L. Robb, Huntingdon.—I never think of filling a proximal cavity without a matrix. There is no danger in putting it on, and no danger in removing it. You cannot destroy the filling at the cervical portion of the tooth, because it will work up itself. I always polish an amalgam filling afterwards, if possible, using a disk or polishing-strip on it. I do not know about the Germansilver strip spoken of; I use the Miller matrix. All I have to do is to loosen the screw-press a little in the space between it and the next tooth, and it is taken off. I pass up silk in order to be sure that there may be no projections, and that it may be perfectly smooth.

Dr. W. B. Miller, Altoona.—I have been styled a "matrix crank." As all know, I have devised several forms of matrices, and not once in six months do I fill a tooth—not even with cement—without a matrix, and I think that every man who does not use the appliance is throwing away half his life. I approve of what Dr. Bassett says, of course, and give a man credit for using the matrix. There are forms of teeth that will require a special matrix made for that purpose.

In reference to breaking off a portion of the contour of fillings,

I have had very little difficulty in that respect. The matrices I use are made of very thin steel, and I always manage to have room enough to place back of them an additional thickness of steel; and after the filling is in position and thoroughly condensed, I remove that little addition of thin steel, and it gives me space to take out the band. The advantage of having a matrix with an adjustable screw is that you can use it over and over again.

Dr. C. V. Kratzer.—In my experience it does not matter very much what you use for proximal fillings, but it is essential to have some kind of matrix. It is a great saving of labor, especially where two amalgam fillings approximate, and in large separations it seems to me it would be almost impossible to put in two amalgam fillings perfectly without a matrix of some kind. I use matrices made of silver strips, having acquired the habit of passing the strip clear around the tooth and holding the end with the left hand, and also holding the amalgam director with the same hand. I also use thin steel strips and thin pieces of file—separating file. Then, of course, the filling requires some trimming afterwards, especially at the cervical edge.

Dr. W. B. Miller.—I find a little objection to the plan of Dr. Bassett,—that of wedging the matrix into position. In case decay has gone all the way down, I think we ought to have a surplus of material and cut it down afterwards. If you fill to a flush you have nothing to work on afterwards.

Dr. H. E. Roberts, Philadelphia.—The continued pressure in inserting the filling will cause the matrix to bulge a trifle, and thus secure the desired end.

Dr. F. S. Bassett.—Regarding the use of a piece of file, and then having to trim the cervical edge, I think there is a great advantage in getting your matrix under the cervical edge in the first place, because it is hard to trim an amalgam filling afterwards. If it is soft you are apt to take too much, and if it is hard it is pretty difficult to remove at the cervical edge, therefore I want to accomplish this in inserting the filling, if possible.

Dr. L. A. Faught.—That is just where the difficulty comes in,—that of the mercury going to the side of the cavity. If we allow the matrix to bulge, the filling projects and leaves the amalgam at the side of the cavity in a more or less softened condition. If you make your matrix tight, the mercury will come to the surface.

Dr. Jos. R. C. Ward.—I suppose I stand alone in that I do not use matrices, at least not to any great extent. I think we are apt to depend too much on the matrix to hold the filling in position

while inserting it, and the result is the filling will not last sufficiently. With the matrix we do not take the same care to shape the cavity and hold the filling as we do without it, and I have had very little trouble in using amalgam except in distal surfaces of second and third molars, when on account of the want of room in removing the rubber dam, I remove the filling. That, perhaps, might be avoided by using a matrix. I use a filling material that sets hard at the time,—Flagg's Standard Alloy: it becomes hard in a few moments. I keep the patient in the chair until hardness is effected. For that reason I have not used the matrix very much. The only case where I could use it effectively would be in the large cavities on the distal surfaces of back teeth. I have had very little trouble in finishing the cervical edges of fillings without the matrix, simply because while the amalgam is getting hard I can do the work.

Dr. W. B. Miller.—Why use a matrix in these particular cases? Dr. Jos. R. C. Ward.—It is impossible sometimes to get the rubber dam up sufficiently far to clear the tooth where it is decayed. We can press up a matrix to a degree we could not the rubber dam.

Dr. W. B. Miller.—Will you please state how you fill two proximate cavities,—say a molar and bicuspid,—how you would condense and finish?

Dr. Jos. R. C. Ward.—First prepare the cavities; fill one, let that get perfectly hard, and then fill the other.

Dr. Jas. S. King.—Do you not find the clamp remove the filling more than the rubber dam?

Dr. Jos. R. C. Ward .- I think, perhaps, it does.

Dr. Alonzo Boice, Philadelphia.—I was unfortunately away when the paper was read, and hence did not get the benefit of its contents. Merely because you have failures,—perhaps due to faulty manipulation, or not using the proper kind of amalgam,—you say it is the fault of the filling. It is the operator. We fill with amalgam and gold, and why? They will tell you it saves the teeth. Some say the best method of inserting an amalgam filling is to place it in the cavity and finish the next day. It can be done as well ten minutes after the insertion as ten days afterwards.

Regarding the method of getting amalgam away from the surface, if you make an opening between the walls of the matrix you must force the free mercury through. The filling with amalgam should be attended with as much care as filling with gold, and be finished so hard that you can pound on it. What kind of amalgam?

Some are better than others, but I care not what you use. I use probably more Standard than any other.

Dr. Jas. S. King.—The doctor made an assertion that some amalgams were better than others. Why are they better?

Dr. Alonzo Boice.—I meant that I could work them better than others. I use Standard, but I do not say it has virtues over all others.

Dr. Jos. R. C. Ward.—One reason why I like the Standard alloy is, it is a fine grade, and in working it up it becomes smooth in the fingers. It sets quickly, and the reason I like it best is I can work it better than other makes.

Dr. G. L. Robb.—Dr. Boice says he can pound on an amalgam filling in ten minutes.

Dr. Boice.-No, I did not mean that.

Dr. Robb .- I would say do not bite on it.

Dr. Boice.—I tell the patient to go out and eat his dinner, and pay no attention to the filling.

Dr. Jas. S. King.-My friend Ward speaks of smoothness in amalgam. There is a principle which produces that. Dr. Boice speaks of Standard alloy. This is richer in silver than any other make I know of, and the percentage of silver makes the condition he speaks of. Take the experiments of Hitchcock and Bogue, some time ago published by the Odontological Society, of New York. Many of the amalgams they tested shrank, and the highest percentage of silver they found an amalgam to contain was fifty-six. Most of them ran from thirty-one to fifty-six. In an article in a Western journal it is stated that an amalgam composed of eighty per cent. of silver is free from shrinkage. It is fine in texture and contains about eighty per cent. of silver, fifteen of tin, three of platinum, and two of zinc. What does the zinc and the other metals do? In the experiments of Hitchcock and Bogue the tin accounted for the shrinkage, because in their report Dr. Hitchcock stated that an amalgam composed of silver expanded twenty degrees. It showed the contraction was not in the silver, but in the tin. Then the question was, Why did they not experiment on amalgam containing a greater amount of silver? From experiments like these I am very clearly convinced that an amalgam should contain seventy-five to eighty per cent. of silver to avoid contraction, and if there is a small amount of tin, as well as platinum, it adds strength and The object of the zinc is to prevent discoloration. It acts on silver like zinc on iron. Two per cent. will not produce in the mouth a galvanic cement that will be perceptible to any extent.

I never use matrices. Believe I have only used one once, and yet I think I have done as fair work with amalgam as some of my friends. We must get the point between contraction and expansion. When you get that balance you want something that will prevent discoloration, and something that will give edge and strength, and these are the reasons why I use an amalgam composed of eighty parts of silver, fifteen parts of tin, three parts of platinum, and two parts of zinc.

Dr. J. R. C. Ward.—Don't you have greater discoloration for the greater amount of silver?

Dr. J. S. King.—The zinc overcomes the tendency towards discoloration. If we could use forty per cent. of zinc without a galvanic current being produced it would be better. That amount might produce conditions that would result in a degeneration of the filling, which a less percentage of zinc might not produce.

Dr. C. S. Beck.—I would like to know what gives the amalgam this soft velvety feeling.

Dr. Ward.—Dr. King says it is due to silver.

Dr. Beck.—I doubt that. I think it is due to the tin. The best amalgam I use is Welch's alloy, and I use to some extent copper amalgam. I think in children's teeth it is just the thing. I do not see why Dr. King objects to the matrix.

Dr. J. S. King.—I do not object to the matrix. I have used it only in one case. The velvety condition I cannot account for precisely. In mixing up an amalgam, if I wash it with alcohol, I get the desired quality.

Dr. Beck.—I never wash an alloy; but the velvety feeling of the amalgam is due to tin and not to silver.

Dr. King.—If due to tin, why not use an amalgam that has a larger per cent. of tin in it?

Dr. Faught.—My personal belief is that where you increase the percentage of silver you have to increase the proportion of mercury, and you thus get the velvety feeling. I do not think it is reliable when as high as eighty per cent. of silver is used.

Dr. Boyce.—Are we not drifting in our discussion? The subject is not amalgam filling. I suppose Dr. Basset merely advocated the use of a matrix to show how we could do better work. I think many amalgam fillings are inserted with the idea that they are cheap, and less care is taken in its making than with gold. I am convinced that if amalgam is worked as carefully as gold it is a first-class article.

Subject passed.

DISCUSSION ON DR. GEO. F. ROOT'S PAPER ON THE PREPARATION AND FILLING OF ROOT CANALS.¹

Dr. Jos. Head.—Dr. Root said he hoped some dentist would conceive of some filling material that would combine all the advantages of oxychloride of zinc, gutta-percha, and cotton, and yet have none of their disadvantages. The perfect root-canal filling I hold is that which thoroughly protects the canal from the entrance of septic matter, and prevents the dentine around the canal from containing germs that may in time work their way into the canal, and that filling material I think has been found. It is "carbolized cosmoline upon cotton." After having read the paper I did to-day, I should be very reticent about coming forward without any facts. Gentlemen, I think it is only fair that I show you these specimens I have at hand.

- 1. A right central; canal was enlarged and carefully filled with gutta-percha.
- 2. Another central; canal drilled out, dried, and filled with carbolized cosmoline and cotton.
 - 3. A central; canal enlarged, filled with oxychloride of zinc.

I then protected the cavities in the crowns of the teeth, so that no leakage would be possible from that source. After this I dropped the teeth in analine ink, and left them to remain for twentyfive days. At the end of that time I took the teeth out, wiped them dry, and exposed the canals. I thought that after this experiment the canal which would be free from the stain of the red analine ink would contain the perfect filling material. I found that the gutta-percha, as you can see, leaked badly, as much leakage occurring through the dental tubuli as through the apical foramen. The oxychloride filling is also badly stained. In the tooth filled with cosmoline, the dentine, as you can see, has a semi-translucent greasy appearance, but not the slightest trace of ink. The ink has not only been excluded from the canal, but kept absolutely out of the dentine. It may be said I used dry teeth here, and the teeth in the mouth are wet. That is true. What we wish is a filling material that will keep the canal dry, and so I have experimented on moist teeth, and I found that the carbolized cosmoline, when the canal was partially dried, did not permeate the entire structure of the dentine, but only in a circular ring round the canal; but it prevented leakage in the same way. The canal was as strongly protected in this instance as if the entire mass had been filled with

¹ Paper printed on page 584 of present issue.

cosmoline. I was at first surprised in experimenting with moist teeth that I filled with gutta-percha and oxychloride of zinc, because I found that the red ink had not penetrated the dentine, when soaked for twenty-five days, nearly so thoroughly as when dry teeth were used, and that the filling material was only stained at the top; but that was easily explained, because when a moist tooth is used the dental tubuli, through which the leakage in part takes place, are already filled with a colorless fluid, and before the ink, in which the tooth is placed, can reach the canal it must completely drive that colorlesss fluid out or work through by means of osmosis. That must take a very long time, and so, although in the first tooth the same amount of leakage occurs, it does not appear, because the filling is colorless; while, when I use a dry tooth, the same amount of moisture enters the tooth, and is in the same relative position to the filling materials, but its presence is at once made known by means of the red ink. Some of my friends have claimed that oxychloride of zinc is just as good, because, when moist chloride of zinc is introduced into a root canal, the dental tubules become filled with zinc chloride, and therefore are in an antiseptic state; but chloride of zinc does give rise to offensive vapors, which cause alveolar abscess.

Dr. Kirk.-How do you know?

Dr. Head.—That is my opinion. I am now speaking before this assembly for the purpose of laying all the facts that I possess before them, not for the purpose of giving my opinion, or forcing any method upon them, but in order that they may philosophically judge for themselves.

Dr. W. B. Miller.—The essayist forgot to mention one good filling,—sandarach, varnish, and cotton. I think if he places one in and undertakes to take it out some time afterwards he will find he has a perfect root-filling.

Dr. Jos. R. C. Ward.—Regarding the discoloration, could not the density of the teeth have an influence on this? Would not the size of the foramen also have an influence? In taking several teeth it is impossible to get them all of the same density; analine would act more easily upon one than the other, also, you may use more care in filling with one material than with another. This, of course, will detract very much from the cases presented, simply because one tooth may be denser than the other.

Dr. Head.—This brings out the point in question,—the liability of error in experiments. The best thing to do, then, is to verify the matter.

Dr. W. B. Miller.—Dr. Head, I want to call your attention to a case where the permeation of cosmoline through the entire tooth-structure caused me considerable annoyance and inconvenience. Several years ago I had a patient, a young girl about fifteen years of age, who came to me with a left superior central incisor,—anterior and posterior proximal surfaces badly decayed. It was a large and expensive operation. I filled the canal with cotton. Less than three months ago the patient returned with the tooth terribly discolored, but the gold work I had put in was as nice as I ever performed. I could not account for it, and had to cut the crown off and put on a Logan tooth crown. I was ashamed of it. Any gentleman who fills a tooth canal with cosmoline, I want him to be a little bit careful that he does not have a discolored tooth.

Dr. Head.—I am much obliged for your warning. I wish you would also carry on the experiment, not for me, but for the profession at large; that you take a tooth, say a central that can be easily filled; put the root of the tooth in plaster; moisten the plaster so that the tooth will be always moist; bur out the canal to the best of your ability, and put in cosmoline, and see if you can get the cosmoline to permeate the entire tooth-structure. It will be only the dentine that is thus affected.

Dr. G. W. Klump .- What do you use on the cosmoline?

Dr. Head.—I place cotton and cosmoline up three-quarters the length of the canal. On top of this I place a cement filling, having wiped out the excess of cosmoline. Over the cement I put gold.

Dr. G. W. Klump .- I should think there would be danger of

getting your cosmoline on the gold.

Dr. Head.—I line the cavity because I think if the dentine could be made water-tight it would be less liable to decay. I dry out thoroughly and have the cosmoline soak into the tubules a short distance around the cavity. I then wipe out thoroughly the excess. In packing the gold I put one piece over the dentine, and then lay piece on piece. The first piece only comes in contact with tooth-substance, and forms a covering to the dentine.

Subject passed.

(To be continued.)

NEW JERSEY STATE DENTAL SOCIETY.—(Continued.)

DISCUSSION ON DR. R. C. NEWTON'S PAPER ENTITLED "THE TEETH AS A FACTOR IN DIAGNOSIS."

Dr. James Truman.—Mr. Chairman, I was very much interested in the paper, from the beginning to the end. There are many points in it that should require careful consideration, I think, and yet I do not agree with some of the statements, which I regard as not being absolutely proven. The idea that syphilis invariably produces a certain class of teeth seems to me an erroneous one. I know very well that we have the idea of Hutchinson, of peg teeth, and, as Dr. Foster has said, that notched teeth are an indication of syphilis. I do not agree with him. It is very evident to my mind that teeth of the character mentioned are found where there certainly had not been syphilis. I have patients with peg teeth in whose cases there was no pathological condition preceding the development of those teeth that could have produced them; and I know of no reason why this character of teeth should be ascribed to certain syphilitic conditions, or to rickets.

In the matter of idiots' teeth I agree with Dr. Foster, that a saddle-shaped jaw is no indication of idiocy. The conclusions in this matter are mainly derived, I think, from mistaken observation. Persons will go to the different institutions of the country and examine the teeth of all the children they find there, without regard to former conditions, whether they are congenital or otherwise. During my connection with the institution for the blind in Philadelphia, I found that a large proportion of the children acquired their blindness through accident or disease, and that congenital cases were comparatively rare; also, that the teeth of the different children were about equal, so far as irregularity and density were concerned. I am very sceptical in regard to examinations of this character; I do not believe they lead to correct conclusions.

In regard to mouth-breathing as a source of irregularity, it seems to me to be a positive error. There are many persons who breathe only in that way day and night, and I imagine that we cannot find a great amount of irregularity from this cause. Sucking of the thumbs might produce it, but it is difficult to imagine how

the pressure of the muscles on the teeth in mouth-breathing can produce the disturbance complained of. Irregularities come from other sources, and these we all understand.

Again, I do not hold to the idea that Americans are so badly off for teeth. The charge has been sounded for many years in our medical associations, and it has been carried abroad, until the American is looked upon as having the poorest teeth. My experience-and it is quite an extensive one, having lived abroad for some timehas taught me that the American teeth are, as a rule, quite up to the average standard, or at least are coming to that. The typical form of American teeth is about as good, taking the average, as any I have seen. We have descended from English, Irish, and German stock; and there has been a deterioration in our teeth, from climatic influences and other causes, and there must be a return to the original type, because all nature seeks an equilibrium and comes back to the original character sooner or later. We are reaching that point, and largely. I think, through the efforts of the profession of which I am pleased to be a member. While bad air and poor conditions produce injurious results, as we all know, I have nevertheless seen as good teeth from children that have been raised in bad air as are found in better conditions. I have examined in Germany the teeth of children dwelling in cellars, where there was naturally a great scarcity of anything like a healthy atmosphere, and I failed to discover any marked difference in the character of the teeth from those more favorably situated. Bright's disease and gouty diathesis have in my opinion a local effect. All those diseases produce a more or less acid reaction in the secretions, and that reaction produces local disturbance, and I do not believe they have any direct effect systemically. The same thing occurs in loss of teeth from shock. All conditions of that kind produce a change in the secretions, and we have an acid action upon the teeth. The question is a very large one, and I do not feel like going into it very extensively, as time will not permit.

Dr. Peirce.—Mr. President, I agree with Dr. Truman, that this subject is a broad and very important one, and that any one who speaks upon it needs to weigh his words carefully, or he will find himself advancing ideas that he cannot sustain. The whole paper was one of great interest; it goes over ground with which I have been somewhat familiar. Taking it up in the order adopted by the author, the first item to which he referred was syphilitic teeth and the influence of syphilis in their premature development or eruption, as it is termed. Where teeth are prematurely erupted, as at

birth or soon thereafter, the organs themselves do not vary in their development from a normal condition; there is simply a waste of superimposed tissue, and they are prematurely erupted by reason of this early absorption of the soft structure which covers their crowns. This occurs where we have ill health or improper nutrition from any cause. A tooth erupted at birth has only a membranous connection or attachment; it has no developed root, and corresponds exactly to the normal tooth; that is, the crown is the same in its calcification, but there is no root; and so in the tooth that is erupted, two months after birth we have calcification of the crown and a slight calcification of the neck, same as normal.

As to the forms of syphilitic teeth, I have had several patientschildren-who were evidently suffering from this systemic disturbance, manifesting itself not in the teeth, but in the bones, as an inheritance from the parents. The teeth of these children were well developed. As an example, a lad of twelve years, suffering from maxillary necrosis, with every tooth in the mouth in excellent condition, so far as formation and freedom from decay were concerned; but the inferior maxilla, from the ramus on one side to the bicuspids on the other, had died, and during or within a period of six or seven months the teeth were necessarily lost with the bone. To repeat, all that part of the inferior maxilla, from and including the ramus on the left side to the second bicuspid on the right, was lost with the teeth located thereon, which were well formed. When the mother was asked regarding her condition during and previous to gestation, she said her husband was in the army, and that he came therefrom diseased, and that she suffered afterwards from like The child had been ordinarily healthy until twelve years of age, when, being subjected to inclement weather, he contracted a cold, and inflammation set in, with the above described result. It was certainly attributable to the previous condition of the parents.

The teeth described by Hutchinson have often been misrepresented by physicians, because they have not accurately studied the markings resulting from the disease. In the superior jaw he represents teeth blunt and concave at the cutting edge; in the inferior jaw they have constricted necks and are concave at the cutting edge. Whether that is induced by improper nutrition or from other considerations, I am not prepared to say; but that it is always present where children suffer from hereditary syphilis is not consistent with my experience. That we find conditions similar to it, where there has been disease during the early periods of the development

of the germs of the teeth, and in their progressive stages, I am well satisfied. We find teeth with restricted necks and with pits and rough edges; but I do not think I ever saw any with the peculiar peg and concave form, as described by Hutchinson, from any other condition than syphilitic taint. The deciduous teeth are usually free from these imperfections, because they have progressed in their development to the calcification of the crowns before The calcification of the permanent teeth commencing at birth, their imperfections may be due to disease or any condition that may induce mal-nutrition. The extent of these imperfections will depend upon the duration and severity of the abnormality. If this systemic disturbance occurs during the first year, the ill development will be on or near the cutting edges; if a year later, it will be farther up on the crown and on all the teeth developing at that time. If it occurs in the fourth year, the incisors would be free from it and the second molars would be somewhat affected, indicating that the imperfections have their origin in systemic abnormality, their location corresponding with the age and progressive development of the tooth or teeth. I have never noticed imperfections in teeth that I could not attribute to some interruption of nutrition during the period in which those teeth were being calcified.

Dr. Allen's name has been mentioned in the paper. I have been interested in sending him some patients in whom gouty teeth were well marked. I have observed that the effect of this disease upon teeth was, as in syphilis, not uniform. The tooth that has been figured as a gouty tooth is one that is thick and short,—that is, the congenital gouty tooth is yellow, short and thick; and teeth that have been used to indicate gouty diathesis are abnormally developed in the manner described. Oftentimes we see children of gouty parents in whom the results of that disease upon the teeth are not developed until late in life; the teeth have been normal in form and development; but in subsequent years they have shown the markings and abrasions on the labial surfaces and the cutting edges which we have believed to result from a gouty diathesis. I have in my practice a large family, one of whom is to-day a great sufferer from gout; her teeth are not affected, but her joints are so enlarged that she can move only with great discomfort. Another sister has her teeth cut so on the labial surfaces that the enamel is almost removed; very little, indeed, remains upon the labial surfaces of the incisors and cuspids. The molars are not so affected.

Dr. Foster.—Are they irregularly marked, or abraded?

Dr. Peirce.—They have a crescent-shaped abrasion, covering about two-thirds of the surface from the neck towards the cutting edge. Of the father I have not definite knowledge; he died in middle life. The mother is living, and is apparently a healthy woman. In this family you see a great difference; one, a great sufferer, has good teeth, free from any gouty marks; and another, able to work at her profession, has teeth marked prominently as I have described.

Of the teeth producing facial neuralgia, the author of the paper makes mention. The influence of various abnormal conditions of the teeth in producing facial neuralgia cannot be ignored, indeed is fully recognized by every dentist. There are many persons under the care of physicians who suffer for months, or it may be years, with this distressing expression of abnormality; the physician after exhausting his pharmacopæia in trying to relieve the discomfort, sends his patient to the dentist. In this specialist's hands the teeth are found sound, so far as decay is concerned, but dental excementosis inducing pericementitis, or pulp nodules inducing pulpitis, may be found there. Either of these conditions is a prolific source of facial neuralgia.

The inquiry has been made as to whether accumulations upon the teeth are indications of renal or hepatic deposits. I should say only as indicating a predisposition to lime-deposits, or the excess of this salt in the blood.

As to the tubercular teeth of children, the influence of phthisis upon children's teeth depends upon the extent and condition of the disease. In the case of a child whose mother suffered with phthisis during the whole period of gestation, the deciduous teeth were erupted without enamel. They remained the usual time, were shed, and the permanent teeth were erupted with an imperfect enamel covering also. The child was never well, though it lived to be fourteen years of age. The imperfect development was due to improper nutrition; and I would not like to say that there was any special marking upon the teeth as indicative of a tuberculous diathesis.

With reference to the teeth of idiots, my experience has been that there is an arrest of development, not only of brain and brainforce, but of the jaws and teeth,—a reversion to an ancestral type in appearance,—the jaws large, and the teeth arranged in a straggling manner, with spaces between them.

Aurists have long recognized the teeth as important factors in

disturbances under their care, and every observing dentist recognizes the fact that an exposed pulp or an excementosed root will produce pain in the eye or in the ear; and the reason for it is very easily explained on the theory of reflex influence.

In regard to mouth-breathing, this is a subject of much interest. In cases of congenitally-enlarged tonsils the child will necessarily sleep with its mouth open, the act of breathing necessitating this. The positions of the deciduous teeth are not affected by it, for the reason that they develop early in life and before the muscles become rigid; but if the enlargement of the tonsils continues, and consequently the mouth-breathing, the constant pressure of the muscles upon the sides of the jaws, as the teeth are gradually being evolved, results in a narrow jaw and protruding front teeth. The first variation is enlargement of the tonsils; the next, and concomitant, is contraction laterally with an accompanying deep and high arch. The tension of the muscles of the cheek and pressure upon the bicuspids must necessarily narrow the arch and protrude the anterior teeth.

The influence of a soft tumor upon the teeth is well recognized by every dentist, and in the same manner the tension of the muscles will displace the teeth.

I think that one of the chief causes of defective teeth in many misses is excessive mental effort. Certainly every dentist recognizes the difficulty he experiences from the deleterious influence upon the teeth of girls who strive for prizes in the schools. In the three or four months before the end of the school term, when the girls are making great mental efforts to obtain the prizes, there is a very marked change in the condition of their teeth; nutrition is diverted and the nervous system placed in an irritable condition, and the teeth suffer. The teeth of misses have given me more trouble during this period of their school terms than those of all my other patients.

Dr. Newton.—How is it with boys?

Dr. Peirce.—Boys will not give their whole attention to study; they divert themselves with base-ball, and it is a good thing for them. This modification in tooth-structure and development may be illustrated from comparative biology and physiology.

As we rise in the scale of intelligence we get a shorter jaw and fewer teeth. Even the horse of to-day has four teeth less than the horse of a few centuries ago. The race-horse has lost in the size of his jaw and the number of his teeth. That is caused by diversion of nutrition. This is a physiological and biological fact, and

upon that fact some of our comparative anatomists and naturalists have predicted that man will eventually become edentulous.

Dr. Watkins .- Dr. Truman stated that he did not believe mouthbreathing caused irregularity. I have a case in my mind now, of a young girl whom I have seen constantly from infancy; at the age of five years she was affected with St. Vitus's dance, and went around with her mouth open, the under jaw hanging, and the saliva running out of her mouth. She was in that condition for about three years, and ever since she has breathed through her mouth. At the beginning of that trouble she had a good-shaped jaw and regular temporary teeth. The jaw began to contract, and continued till, at the age of eleven years, the upper jaw was so narrow and the teeth so close together that you could not place the tip of your first finger between them all the way up in the roof of the mouth; the temporary lateral incisors were entirely covered by the centrals, and the cuspids lapped over the edges of the centrals; the bicuspids were standing in and out of the arch, and there was about space for ten teeth instead of fourteen.

I had another case, of a boy, who had a good round arch in infancy. At about the age of three years he had his nose broken. It was neglected at the time, and one nostril partly closed, so that he breathed with difficulty. The result was mouth-breathing; and the consequent pressure of the muscles of the cheek upon the temporary molars has so contracted the arch that now, at the age of ten, there is not much more than space enough to put your finger between the teeth in the roof of the mouth. The arch, which was round, has become deep and narrow. I have seen both cases from the infancy of the patients, and I cannot ascribe the irregularities to any other cause than mouth-breathing.

Dr. Atkinson.—We are in deep water. I have heard enough this morning, in the reading of the paper and the discussion of it, to lay the foundation of a very good syllabus, pointing towards a solution of this question; but as to the solution of the question, there is not coherence enough in the concensus of the minds investigating it, and the terminology used, to enable us to correlate what has been said into an understandable and useful shape, that we can carry home with us and apply in anything like regular order of succession in understanding the conditions and knowing how to meet the demands. There is one man who has given more attention to this question than any other man within the range of my knowledge. He was in charge of the effete nobility of France, who had by intermarriage become so afflicted with distorted features as

to make it pretty certain that if you met a very ugly woman or man on the streets of Paris, that person was a member of the nobility. Without much erudition or knowledge, he was able to get control of those people, and by means of mechanical appliances he has brought back their features to a presentable shape. If this is true, it has much to do with our inquiry as to where the deflection from the normal standard takes place; how any dereliction is always tending towards bad development.

If we would study the development of the organs in question from the time of the differentiation of Meckel's cartilage all the way through wherever histology would lead us, and we had the time, -not having to fight like beavers for our daily subsistence,we might arrive at something profitable to talk about. And I am only talking now. I wish there was nothing to do but that kind of talking by question and answer which brings out the ideas of different minds; and then, if men were sufficiently in earnest to receive some kind of impression from what they have heard, we would travel more together and be able to appreciate in some measure this subject, which is incomprehensible without the deep understanding of the laws of primogeniture and heredity; and how it is that past molecular experiences of antecedents are stored in the organs that we have to deal with, causing them to be built according to the typical standard of organs; these principles, I say, will have to be better studied than they have been before we make much progress. I notice that every clean-cut, bright-minded physician or surgeon, who goes about his work with an earnestness that is not perfunctory, who feels the responsibility of his office and tries to get a good mental grip of his subject to enable him to benefit his patients, will hesitate about making prescriptions. But the many seem to make an effort to get rid of the responsibility by writing some cabalistic sort of necromancy on paper and sending it to an apothecary. When we are weak enough for this sort of effeminacy we would better confine ourselves to mechanical appliances.

Dr. Rhein.—Mr. President, the subject of the paper, "The Teeth as a Factor in Diagnosis," has a peculiar interest for me, because for the past two years I have been making investigations that tend to show the teeth to be a very important factor in aiding the physician in diagnosing a number of constitutional disorders and systemic troubles at the commencement of those troubles, before they assume a well-defined shape and are not clear to the eye. The results that I have already obtained have been sufficient to enable

me to speak quite positively in opposition to the views advanced by Professor Truman on this subject. The disease that has been particularly engrossing my attention in this direction is pyorrhea alveolaris, in cases where it has been demonstrated that the affection is the result of some general systemic disturbance. In investigating this subject I have met with several cases where there was no evidence whatever of any apparent local disturbance, such as a decided acid reaction, the oral secretions being apparently in a healthy condition, the teeth good, and the mouth in the cleanliest condition; and yet at intervals the patients suffer the severest pain. there would be an ædematous condition of the soft tissues above the necks of the teeth, resulting, if neglected, in a discharge of pus from the sockets of the teeth, but which would disappear upon the patient following out a system of prescribed hygiene. In these cases an exploring instrument passed under the gum soon reaches the pocket or pouch which we find in all forms of pyorrhoea alveolaris, and which arises from lack of nutrition in the pericemental membrane. To my mind it has been positively proved that it arises right in that region from mal-nutrition, or lack of nutrition, resulting, in extreme cases, in a retrograde metamorphosis of the tissues, and partial destruction of the roots of the teeth. I have in my office a tooth the root of which has been half absorbed by pyorrhœa alveolaris, presenting a condition similar to some implantation failures. One point of difference that has particularly attracted my attention is that in the absorption of the root, after a tooth has been implanted, or replanted, the edges are left very sharp and well defined, while in cases of retrograde metamorphosis due to systemic disturbance the edges are quite rounded and oval. not having that saw-like appearance possessed by the others. I desire particularly to bring up that one point in contradistinction to the remarks made by Professor Truman as to all those forms being due to local disturbance of the parts. And I wanted to add a word to the remarks of Professor Pierce on trigeminal neuralgia, where there was no evidence of dental caries, nor any evidence of any kind of trouble about the teeth. He limits the cause, if it does arise from the teeth, to exostosis and to pulp nodules. I want to add a cause which I have found almost as frequently as the others,-that is, an embeded tooth or root.

Dr. Atkinson.—I failed entirely to mention one most important point, in my estimation,—the mistake which every speaker that I have noticed has made in regard to the premature eruption of deciduous teeth; they misapprehend the actual condition, and talk

of the soft parts over the erupted tooth as having been absorbed. They do not remember, or else never knew, that that tooth never had a calcified tissue over it; it has nothing but connective tissuefibres over it to hold the crown, generally an incisor, either central or lateral. And then it was said that they never had any roots. How do they know that?

Dr. Pierce.—The doctor wants to know whether I have any knowledge that the teeth erupted at birth have no roots. I have knowledge, because I have taken them out and found they had no roots.

Dr. Atkinson.—If anybody else but a real morphologist had said that, I would have said it did not demand a reply; it is so puerile. They had no roots; of course they had not. But how do you know they would not have had roots if you had allowed them to remain the proper time? Why consume our time with such figments of knowledge! Had he let them alone he would have been able to determine, at the adult period of the child, whether they did have a root or not. I have seen them that did have roots, and remained there. I have taken such teeth out, too, just for the reason that I loved the mother and did not want to have her blessed fountain of pabulum interfered with by the irritation of that little thing that came out of time and place.

Here we are stumbling about what absorption is, and the removal of deciduous tissues. Do not let us make the mistake of thinking that every tooth must finally be like every other tooth, and that the multi-cuspid teeth must have multi-roots, -many roots. I do not claim to have been in the counsels of the infinite producer of all these things to hear how he has formulated them exactly, but I have smelled through the keyhole, and have learned a few of the types, so that I am somewhat familiar with the subject. All these bodies are loaded down by being laid together as antecedents of the We say dentine comes from the dentinoblasts. been called odontoblast. Call them what you like; they are little bodies that are capable of holding the stored radiancy that is to form that type of tooth, so as to appropriate the lime-salts, and become hard enough to perform its function. We want to know something about the antecedent potency that determines whether there shall be one, two, or three roots to teeth.

Dr. James Truman.—I have been called to task in regard to my views of mouth-breathing. I would like to know how it is possible to produce that contraction of the jaw by simply breathing. There is certainly no pressure against the teeth from keeping the mouth

open. Any individual in this room can breathe with the mouth open and not move the muscles at all. There is not enough pressure of the muscles upon the teeth to produce any irregularity. A member of my family, owing to a short upper lip, breathed that way all through life, and had a perfectly regular set of teeth.

Dr. Newton.—I am exceedingly obliged to the gentlemen who have followed me; the discussion has been extremely interesting and instructive to me. I came here to learn, not to teach anybody.

There has been nothing said, that I remember, in this discussion about Bright's disease. That is a point that every general practitioner is deeply interested in, and covers an immense amount of ground, particularly the sensitiveness, or hyper-sensitiveness of the nerves in that disease. If hyper-sensitiveness of the teeth is a symptom of Bright's disease, either constant or occasional, we want to know it. It was a very strange thing to me, when my friend Dr. Watkins told me he had noticed that condition in Bright's disease. I do not know that it has any connection with the disease, but we must not jump at conclusions. If you gentlemen will bear this in mind, and study the condition of the teeth in Bright's disease, and report your observations, you will be conferring a benefit upon humanity. I am very much obliged to you all for the kindly spirit in which you have received my paper.

On motion, the paper was passed.

(To be continued.)

Editorial.

THE BROWN-SÉQUARD "ELIXIR."

THE course of the experiments in the subcutaneous injection of testicular fluid, first suggested by M. Brown-Séquard before the Société de Biologie of Paris in June last, has been such as to call for comment from scientific men in all quarters. As soon as the suggestion was made public in this country, a large number of physicians—many of whom, as results have shown, were wholly unfit, because of their lack of a knowledge of the importance of antisepsis, which should be observed whenever injections or incisions are to be made through the epidermis-hastened to perform the operation. In many instances urged on by patients, they rushed in where men of more extended experience would have hesitated to operate until they knew more of the methods adopted by Brown-Séquard in his Not only did incompetent men first take up the treatment, but they went into print, heralding their "expectations," which in many instances fell to the ground, their patients returning to them suffering from veritable septicæmia, as the natural result of the injection of putrescent matter. By so doing they have not only done themselves harm, but have been the means of causing injustice to be done a real scientific discovery.

The strangest part of the whole matter has been the position taken by many of the medical journals throughout the country, which in many instances have joined in the popular clamor against a treatment that had not had a fair trial. The results of the bungling, unscientific operations of wholly incompetent men have been used to decry the value of the real scientific experiments of a man whose many additions to our knowledge of scientific medicine should have entitled him to at least a respectful hearing. Let us review the history of the case, and learn the real claims made by M. Brown-Séquard. In the first place, he did not call his discovery an "elixir." That name was given to it by the secular press. He only claimed for the fluid obtained by crushing the testicles of healthy, vigorous animals a marked tonic effect, which seemed to be especially manifested in the cerebral and spinal centres. stated very plainly that its effect was not lasting, disappearing in his case in about three weeks. All fair-minded medical men must

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admit that his à priori reasoning which led up to his experimentation was sound. The effeminacy of eunuchs is proverbial. The wide difference between the gelding and the stallion is also well known to horsemen. The marked debilitating effect of masturbation or sexual excess, when practised before the individual has fully matured, or when his powers are declining during old age, is also well known. The mental and physical depression dependent upon the loss of semen from any cause is out of all proportion to the effect produced by the nervous excitement accompanying such loss.

On the other hand, it is well known that abstinence in sexual intercourse gives increased strength and mental force. Athletes are very strict in regard to the matter of sexual intercourse while in training, and literary men often absent themselves from their wives when they have an especially hard task to perform. These well-known clinical facts led Brown-Séquard to the conclusion that semen possessed a marked dynamogenic power, and, when allowed to collect in the seminal vesicles, was absorbed into the system.

He did not attempt to say what the nature of the tonic principle was, but demonstrated, to his own satisfaction at least, that in cases of debility, especially that accompanying old age, as in his own case, its lack could be supplied by the injection of semen from healthy animals. He did not jump at these conclusions, but had for many years held these views, and had made experiments upon animals as early as 1875, and had stated his ideas upon the subject several years previously, as early as 1869, in a course of lectures before the Paris Faculty of Medicine. In discussing the influence possessed by several glands upon the nervous centres, he put forward the idea that if it were possible without danger to inject semen into the blood of old men, we should probably obtain manifestations of increased activity as regards the mental and the various physical powers.

The danger which at that time was considered certain from the injection of organic matter into the system no doubt prevented him from making the experiment then. Nevertheless, in 1875, he made some inoculations on dogs, which, while negative in most instances, yet were sufficiently successful to keep up his interest in the investigation. Finally, in 1888, he again began his experiments, regarding which he says:

"At the end of last year I made on two old male rabbits experiments which were repeated since on several others, with results leaving no doubt as regards both the innocuity of the process used and the good effects produced in all those animals. This having been ascertained, I resolved to make experiments on

myself, which I thought would be far more decisive on man than on animals. The event has proved the correctness of that idea.

"Leaving aside and for future researches the questions relating to the substance or substances which, being formed by the testicles, give power to the nervous centres and other parts, I have made use, in subcutaneous injections, of a liquid containing a small quantity of water mixed with the three following parts: first, blood of the testicular veins; secondly, semen; and, thirdly, juice extracted from a testicle, crushed immediately after it has been taken from a

dog or a guinea-pig."

"I have hitherto made ten subcutaneous injections of such a liquid,-two in my left arm, all the others in my lower limbs. The day after the first subcutaneous injection, and still more after the two succeeding ones, a radical change took place in me, and I had ample reason to say and to write that I had regained at least all the strength I possessed a good many years ago. Considerable laboratory work hardly tired me. To the great astonishment of my two principal assistants, Drs. D'Arsonval and Hénocque, and other persons, I was able to make experiments for several hours while standing up, feeling no need whatever to sit down. Still more: one day (the 23d of May), after three hours and a quarter of hard experimental labor in the standing attitude, I went home so little tired that after dinner I was able to go to work and to write for an hour and a half a part of a paper on a difficult subject. For more than twenty years I had never been able to do as much. From a natural impetuosity, and also to avoid losing time, I had, till I was sixty years old, the habit of ascending and descending stairs so rapidly that my movements were rather those of running than of walking. This had gradually changed, and I had come to move slowly up- and down-stairs, having to hold the banister in difficult staircases. After the second injection I found that I had fully regained my old powers, and returned to my previous habits in that respect."

Not only was his physical condition improved, but his capacity for mental labor was markedly increased.

To guard against the change of auto-suggestion, he had his limbs tested with a dynamometer for a week previous to the trial, and during the month following: the average number of kilogrammes moved by the flexors of the right forearm before the first injection was about $34\frac{1}{2}$ (from 32 to 37), and after that injection 41 (from 39 to 44), the gain being from 6 to 7 kilogrammes. In that respect the forearm flexors reacquired, in a great measure, the strength they had when living in London (more than twenty-six years before).

Brown-Séquard's experiments have been to a certain extent confirmed by M. Variot, who made a communication to the Société de Biologie on June 29. The patients chosen were debilitated men, aged fifty-four, fifty-six, and sixty-eight years respectively, and they were not informed of the nature of the treatment adopted. In all three cases the injections were followed by general nervous excitement, increased muscular power, and stimulation and regula-

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tion of digestion. M. Variot's observations dispose of the objection that the results observed by Brown-Séquard in himself were due to "suggestion." These experiments, together with some that have come under our notice, lead us to believe in the efficacy of the treatment. Two cases, among others which have been observed by us, have shown such marked benefit that we will relate their history.

One was that of a man past sixty years of age, whose occupation was of such a character that he was compelled to be on his feet much of the time during the day, and whose evenings were spent in casting up his accounts. During the summer he found himself so "run down," as he expressed it, that he would fall asleep over his accounts, and very much feared that he would have to give up his position. After one injection he was so much improved that he said he felt twenty years younger, and when asked whether he wanted a second, remarked that "so long as I feel as well as I do now there is no need of it."

The other was a man in the prime of life, who was engaged in constant mental work. For six weeks previous to the treatment he had been suffering from congestions of the pons and upper part of the spinal cord, brought on by overwork. He was completely incapacitated for mental work, but was unable to get away for a much-needed rest. He complained of great lassitude, especially marked at night, and a heavy, weary sensation at the base of the brain, with loss of the use of his right arm for a time Physical exertion, walking, relieved the congestion of the nervous centres, but did not give needed strength for mental labor. What was needed was complete rest, or a nervous tonic that would bridge over the present and allow nature to reassert herself, the patient being otherwise in good health. He had used the phosphates until they had apparently lost their efficacy, and then decided to try Brown-Séquard's "clixir." In this instance it did not show any stimulating effect worth noting. Three hours after the injection was made the pulse-beat had slightly increased; but the temperature remained stationary; there was slight exhibaration only, as shown by the increased tension of the pulse. On the second day he reported feeling considerably better, and on the third day resumed his ordinary literary occupation, with entire absence of the previous weariness complained of. Two weeks later he reported having felt a slight return of the old complaint, but only after an unusually hard day's labor, both mental and physical. His general condition was undoubtedly very much improved.

A physician here in the city has had similar results in several instances, but is withholding his report until there is a change in the attitude of the medical press towards the question, which up to the present has virtually classed all men as charlatans who have experimented with the "elixir." Appearances, however, point to a change of front. Daniel's Medical Journal, Austin, Texas, says, editorially, in the September number:

"In our last issue we said, 'To us there is something indescribably ludicrous in the idea, or association of ideas, that a general tonic or nerve stimulant was to be found in the testicles of a young animal.'

"Now we wish we hadn't said it. There are more strange things in chemistry than ever were dreamed of in our philosophy, Horatio,—and we have 'put our foot in it.' Well, there is consolation in the reflection that wiser men than we,—to wit, the erudite editor of the Medical and Surgical Reporter, and others,—who have ridiculed the idea, are in the same boat, and if we are laughed at, they will be also.

"It transpires that Parke, Davis & Co. have, with that intelligent zeal in the cause of new remedies which for years has characterized them, sought, found, and isolated the active principle of the 'juice' prepared according to Brown-Séquard's formula, and they recognize it as 'spermine'—an alkaloid first described by Charcot and Neumann.

"This alkaloid is found in the animal economy, elsewhere than in the testicles, and in the various excretions, especially in the sputa of consumption; in all wasting diseases it is excreted in abundance, and hence there is philosophy and good sense in the suggestion to replace it. Tests made with this alkaloid have proven it to possess decided stimulating effects upon the cerebrospinal centres, and there is a possibility, after all, that it may be utilized as a remedy in exhaustion, etc. Moreover, Parke, Davis & Co. have prepared a salt of the alkaloid, the 'hydrochlorate of spermine,' for hypodermic use which is now on the market."

We may expect to hear from others in a similar strain ere long. This is not the first time a real discovery has been made the subject of ridicule. There are journals which even yet discredit the value of Koch's and Pasteur's discoveries. It has ever been thus, and perhaps always will be so. The world is most unfair, but the worst is that it too often cloaks its true inwardness under the plea of conservatism.

AMERICAN DENTAL ASSOCIATION.

THE past meeting of the Association at Saratoga was not up to former sessions held at that place. The attendance was much smaller and the interest in the proceedings was much less evidenced than at former meetings. Few papers were presented and the dis-

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cussions were very limited, so much so that the editor of the *Cosmos* pronounced the meeting "the least valuable of any held for several years." He further said, "the sections had not made preparation at all adequate to that which had been accomplished for previous sessions, and, with one exception, and a single paper in another section, there was little to indicate that due effort had been made for a creditable presentation of the subjects embraced in the several departments assigned to the respective sections."

This would seem to be throwing the blame of the failure of the meeting upon the chairmen and secretaries of the several sections, which is not just. We had the honor to fill the position of secretary for sections four and seven, and can answer for those two sections that the chairmen and ourselves did our utmost to present a good programme. In our official capacity we wrote personal letters to each and every member of both sections, with only one response, and then, at very considerable inconvenience to ourselves, volunteered to present a lantern exhibit which was to be accredited to both sections. No; the fault did not lie with the officers, they did their duty. The facts in the case are that the profession is largely written out. As we said editorially in the August number of the JOURNAL when opposing the calling of an International Dental Congress, so say we again, "Those who are directly connected with the American Dental Association realize the fact that it is growing harder every year to get suitable material to make a good programme; and why? Simply because of the division of interest on account of the many anniversary meetings of large proportions which have been held in America the past few years." The American Dental Association is in its decadence, and unless something is done to revive interest in this time-honored institution it will surely pass into oblivion. It is therefore proposed to take advantage of the event of the World's Fair to be held in the United States in 1892, and have a memorial meeting at the place where and the time when that celebration shall be held. Such a movement will give the Association a decided impetus forward and tend to endow it with a new lease of life. We have been in correspondence with several prominent members of the Association and all express themselves as highly pleased with the idea. It is none too early to begin to agitate the question, as the matter must be fully canvassed before the next meeting of the Association is held in order to formulate some concerted plan of action. Let us hear from prominent members of the profession in regard to the proposition.

Foreign Correspondence.

We are indebted to Dr. Bonwill, who is down on the programme for a demonstration of The Use of Smooth Oval Pointed Pluggers in both the Electrical and Mechanical Mallets for Packing Abbey's Non-Adhesive, as well as any Adhesive or Cohesive Gold Foil, for a report of the meeting of the British Dental Association, taken from the daily press:

"The ninth annual meeting of the British Dental Association opened most pleasantly last evening at Brighton. The president-elect, Mr. S. Lee Rymer, J.P., L.D.S., Eng., held a reception at the Royal Pavilion, and this was followed by a concert and conversazione. There was not a large attendance. The invitations were limited almost entirely to members of the dental and medical professions, and many of those who are expected to put in an appearance during the meeting had not vet arrived in the town. For the meeting is to last to-day, tomorrow, and Saturday, and in these three days some very interesting discussions and demonstrations of some very pleasant social gatherings are to take place. The actual business commences this morning, as early as nine o'clock. Last evening's function was to give the members of the association an opportunity of introduction to the gentleman who is to rule over them during the ensuing year, and of becoming acquainted with one another. The local organizing Honorary Secretary, Mr. J. H. Redman, D.D.S., L.D., S.I., had made fitting arrangements for the reception of so distinguished a body, and the dentists, who journeyed from various parts of the kingdom, were heartily welcomed by their professional brethren of the queen of watering-places. Though, as has been said, the company consisted for the most part of persons associated with dentistry, there were a few others present. Several ladies and several of the medical men of Brighton were there. The formal reception lasted from eight until about a quarter to nine, when the concert commenced in the music-room. The concert was, of course, the chief attraction; not many preferred to roam about the corridor, the north and south drawing-rooms, and the salon, and inspect the many interesting objects, -especially interesting to dentists, -which were exhibited. All the principal makers of dental apparatus and instruments displayed large collections of articles, and many of them were able to show some new invention of most delicate mechanism. Messrs. Coxeter & Son, of Grafton Street, Gower Street, London, for instance, had a small hand-engine for drilling purposes. It is worked by electricity from cells supplied by the Electrical Power Storage Company, and they consider it in many ways preferable to the machine worked with the foot. It certainly seems a very neat contrivance and extremely handy. The same firm also show their most recent form of regulator for controlling the supply of nitrous-oxide gas, and an apparatus for the supply of electric light to assist the dentist in examining the mouth.

The dentist fixes the accumulator upon his forehead and the light is thrown well upon the mouth of the patient. Then Messrs. C. Ash & Sons, of Broad Street, Golden Square, London, and the Dental Manufacturing Company, of Lexington Street, Golden Square, had splendid collections of chairs, engines, apparatus, and every kind of instrument which the dentist could possibly require. The S. S. White Dental Manufacturing Company, Philadelphia, U.S.A., showed a wonderful case of specimens of gold and porcelain crown work by leading American dentists. Messrs. W. & J. Jamieson, of Broad Street, Golden Square, Messrs. G. W. Rutherford & Son, of Poland Street, Oxford Street; Messrs. F. H. Hallam & Son, of Lisson Grove, Marylebone; Messrs. Barth & Co., of Poland Street; Mr. D. Collins, of Poland Street; and Mr. J. F. Blennerhassett, of Vernon Street, King's Cross Road, had also a number of useful instruments on view. A fine collection of micro-photographs illustrating exostosis and pulp calcification, lent by Mr. D. E. Caush, of Brighton, attracted a great deal of attention. In fact, the whole of the exhibits were closely examined by the professional men, who appeared to be highly gratified with the display. No special decorations had been provided for the occasion. The pavilion rooms were in their ordinary condition, but the visitors were delighted with their appearance and the luxurious accommodation they afforded. It is not in every town that the British Dental Association has a palace in which to hold its annual meeting. A vocal and instrumental concert was given in the dome, the programme being admirably sustained by well-known local talent."

The invited guests, including the ladies of the attending dentists, and also many physicians, numbered many hundred.—ED.

We are in receipt of a long personal letter from Alfred Burne, D.D.S., Sidney, New South Wales, in which he describes the condition of dentistry in Australia. It seems that it is the common thing for druggists and even manufacturing chemists to run a dental office also. Dr. Burne cites a case where a dispensing apothecary was sued by a patient for alleged ill treatment in relation to a set of teeth which he had inserted for her. His "shop," according to the testimony, was situated back of his drug-store and connected with it. The following circular, considerably abridged, and received from a manufacturing chemist in this city will give some idea of how they do things in Australia. The names of the parties have been changed so as not to give the true parties any free advertising.

We should be most happy to have similar communications from our other Foreign Correspondents. This department of the journal can be made one of the most interesting in the journal. Let us hear from all our correspondents, remembering that we must give as well as receive in this world if we desire to keep out of debt. The circular will be found on the next page.—ED.

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THOMLINSON BROS., Mechanical and Surgeon Dentists.

Artificial Teeth—Single Teeth 10s. Full set from £5.5s. Perfect fit, and every satisfaction guaranteed.

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Queensland Ointment is the best application for all kinds of Sores, Burns, &c., it has cured sores of 10 and 12 years' standing when all other remedies have failed. We are continually receiving accounts of the wonderful cures it has made. In special cases the BLOOD PURIFIER should be taken in conjunction with the Ointment, as it removes Pimples, Blotches, &c., and makes the blood pure and healthy.

Queensland Liniment has proved itself to be the very best application for Sprains, Bruises, Rheumatism, &c. Rubbed on the chest and back, it relieves Coughs, Bronchitis.

Certain Corn Cure removes hard and soft corns, also warts, without pain. This is the best and cheapest corn cure made, &c., &c.

DISPENSING.

Great care is taken in this important branch, nearly all the preparations being of our own manufacture and thoroughly tested before entering the Dispensing Departments, we are enabled to supply our Tinctures, &c., of the utmost purity and freshness.

ENGLISH, FRENCH & GERMAN PRESCRIPTIONS DIS-PENSED WITH ACCURACY AND DESPATCH.

ANALYSES

Foods, Milk, Soils, Urine, &c., &c.

Domestic Correspondence.

TO THE EDITOR:

I have observed that a good deal of attention has been given of late to the subject of crystal gold, and, as I have had a good deal of experience with this preparation of gold, a recital of it may not prove uninteresting to the readers of the International Journal.

It is now nearly twenty-five years since my attention was first directed to Watts's Crystal Gold, and it occurred in this way. Dr. Wetherby, of Boston, was asked to give a clinic at one of the meetings of the American Dental Association, and Dr. B. J. Bing, now of Paris, was the patient. Dr. Wetherby selected for his operation a large compound cavity in an inferior first molar. After preparing the cavity in the usual way, he proceeded to fill the bottom of the cavity with soft foil (rubber dam was not in use in those days), and continued using it until the cavity was half or two-thirds filled. He then finished his filling with Watts's Crystal Gold. I had never seen a more uniform and solid surface than was obtained by that method. Soon after that I purchased some of the gold, and used it as above indicated, and found that the results were most gratifying. I was then led to use it in cavities where no soft-gold foil had been used as a foundation, and the results were equally satisfactory. Many of these operations were made in mouths which I have had an opportunity of examining during all these years past, and the operations thus made look as new or better than those of other preparations of gold made subsequently.

For reasons which I have never been able to satisfactorily explain, I discontinued its use for several years. About 1873 I again began using it, and my opinion of its merits was rather intensified than otherwise; but after a year or two I again abandoned it, and have only occasionally used it until within the past year, when I purchased another lot, and found the same pleasing results attending its use. Last autumn, when comparing methods of practice with Dr. S. G. Perry, of New York, he remarked that he had recently been using a good deal of Watts's Crystal Gold, and with great satisfaction; whereupon we mutually discussed its merits, and mentally analyzed its various properties.

I am convinced that my experience with this gold is in keeping with that of other members of the profession, for inquiry has

elicited the information that many have used the gold in question with a great degree of satisfaction, and then, without positive reasons therefor, have abandoned it.

My experience with crystal gold has taught me the following: That it should be used in moderately small pieces, and with blunt-pointed instruments with shallow serrations.

That in cavities difficult of access, because of the close approximation of adjoining teeth, it is contra-indicated, inasmuch as there is a tendency for it to break into pieces or crumble in the attempt to introduce it.

That when used with care there is no greater liability of imperfect adaptation or discoloration of the tooth than when foil or other preparations of gold are used.

That surface discoloration is not more frequent than by the use of other gold, and that when it does occur it is not because of any adverse conditions inherent in the gold.

That it is specially adapted to large operations where the restoration of contour or great hardness of surface is desired.

That with a given amount of time and labor, better operations can be made with this gold than with any other with which I am familiar.

After having said so much in favor of Watts's Crystal Gold, the reader may infer that I use it to the exclusion of all others, which is not true. I find it most useful in finishing filling, and in cavities easy of access where large or broad-pointed instruments can be used to advantage.

Yours truly,

EDWIN T. DARBY.

PHILADELPHIA.

TO THE EDITOR:

Just a word in regard to the care of the teeth of the sick. It is surprising to find how few trained nurses give any attention to the teeth of those they have in charge. Everything else is looked after and kept clean but the mouth. The lying-in patient has her hair brushed within a few hours of delivery, but is left for days or weeks without any attention being paid to the mouth; and this, too, in the care of professional nurses under the best physicians. It is astonishing to find how utterly the mouth and teeth are neglected in case of illness, and it behooves every dentist to educate every medical practitioner he comes in contact with in regard to the importance of attention to the teeth of the sick. And something can be done by teaching the laity that they must demand

care of the mouth in illness. If germs destroy the teeth, what a good time they must have in the mouth of a typhoid-fever patient; and, in fact, in all cases of adynamic disease. The fever that accompanies it and the diet which has to be given combine to make the mouth a hot-bed of germs, and, no doubt, many cases of carious teeth have arisen from the neglected local conditions, quite as much as from the constitutional depression.

And the comfort to the invalid! If you wish to see a grateful patient, rinse the mouth with some antiseptic solution, after he has been left for days without care! I have had people tell me that nothing done for them in the course of their illness gave them such a feeling of comfort and rest as purifying the mouth.

In extreme cases, where the patient is in a comatose condition, the mouth can be wiped out with a soft cloth wet in the antiseptic solution; but in most cases I have found the ordinary invalids' feeding-cup to answer the purpose nicely. The patient takes the solution into the mouth through the long spout, and, having rinsed thoroughly, closes the lips about the spout and forces the liquid back into the cup,—all done without raising the head from the pillow.

I have no doubt that there are physicians and nurses who attend to this matter, but I also doubt not that they are few and far between.

Yours truly,

EDWARD C. BRIGGS.

BOSTON, MASS.

To THE EDITOR:

The invisibility of clinics has long been a source of annoyance to operators and a disappointment to observers. At the late meeting of the Massachusetts Dental Society the problem seemed to be solved for once, and I mention it so it may be tried for general application. In giving my description of the operation to be performed I stepped upon a chair, which brought me up sufficiently high to be plainly seen and heard. I then found it practicable to raise the patient sufficiently to accommodate my own elevation. This brought the operation into full view of all standing around, and no one's sight was obstructed, and all got a clear idea of the points made in the operation.

Another operator, giving a descriptive clinic from models, we placed sitting in a chair upon a table, which produced the same desired effect. I suggest, as the outcome of this, a small platform, just large enough for chair and operator, from fifteen inches to

twenty inches high. This will bring the patient and operator into full view of all standing around. I hope it may be tried and found to serve the purpose.

It has for many years seemed to me the silk furnished for dentists for ligatures is much coarser than is needed, and causes the patient much pain that might be avoided. I have used with a great deal of satisfaction Eureka embroidery silk, stranded and waxed, a single strand passed twice around the tooth and tied. This will turn up the edge of the rubber dam, and carry it under the gum around the neck of the tooth, with a minimum of compression of the tissue, and causing but little pain. This is worth a trial by those not already familiar with it.

THOMAS HILLEBROWN.

TO THE EDITOR:

There appeared in the editorial columns of the *Dental Cosmos* of June, criticisms on remarks I had the honor to make before the New York Odontological Society in March last, to which, with your permission, I would like to reply through your journal.

It seems strange to me that, because some strictures had been made on a commercial house, there should appear, in the editorial columns of what claims to be a professional journal, an attempted vindication of that house. If the answer had come as a communication from that company, all well and good; but it seems to me that in this instance the editor let the commercial side of the question take precedence of the professional, or he considered for the time that his journal was simply a commercial publication devoted exclusively to the interests of that house.

The editor says he "will call attention to but one of the statements reported, although others are equally incorrect." It seems to me he made an invidious distinction, preferring to attack an invited guest of the society, rather than a member of the society whose proceedings they were anxious to keep.

At the time my remarks were made I had every reason, and I still have the same reasons, for believing that in the main the statements were correct. I find one error. I stated that if I had been rightly informed, two hundred engines of the Hodge-Weber patent were made and ready to put together; I was not correctly informed. The editor states that "there were not two of them made either in whole or in part." I certainly saw two of them, January 20, 1887, one of which passed into the possession of the S. S. White Company, and the other belongs to and has been used since that time by Dr.

Perry, who made the statement at the meeting where my remarks were made, that the working of it was so satisfactory that he had refused to sell it for five hundred dollars.

What inference could any one draw from the fact that after two and a half years, with two hundred orders in the hands of the original inventors, except that it was not their intention to place it on the market. If two could be made from a pattern, then two hundred could be made from the same pattern. I know that it would take some time to prepare machinery to make them quickly and economically, but they had the model machine for a pattern and Mr. Weber, one of the inventors; but instead of employing him to complete the machine—which Dr. Perry says was then "a more perfect one than any on the market"—to accommodate the two hundred who desired it, they employ him on other things. Is there any wonder that they received criticism for the delay.

I have no quarrel with any man or firm who obtains a patent on the outcome of their brain-work. What I do object to is that any manufacturing house should buy up these patents and neither manufacture them nor allow others to do so, thereby depriving the profession of the benefits to be derived. This is not the only machine by any means that has met this fate.

Any further than this I have no quarrel with the S. S. White Manufacturing Company. I have traded with them for thirty-four years, and in all that time I have found them square-dealing and honorable; so, whatever I have said can result from no ill will I bear them.

G. A. GERRY.

LOWELL, MASS., July 25.

TO THE EDITOR:

In your last number you throw a small rock at the State Board because we were not represented in the meeting at Saratoga. We have felt serious regret each time we have not been represented in national meeting, but several good reasons exist to account for the seeming neglect.

The State Society has taken from the Board those members of college faculties whose interest and pleasure it is to attend the annual meeting of the American Association. Other men have not time or cannot afford the expense of attending, as no fund exists upon which to draw to pay the necessary travelling expenses of representatives.

Then again, the American Association is less popular than it has been with us formerly, and "fails to draw," as theatre men say.

The first meeting of the National Board is called too soon,—always at nine A.M., the first day of meeting of Association, so that it is often difficult to get there in the forenoon of Tuesday, and always unpleasant to miss that first meeting.

The arrangement to hold the meeting of the State Society one week in advance of the American is almost wholly for the convenience of city men, who take one long vacation, and does not so well accommodate others, who are not prepared to use a second week immediately following one devoted to the State Society.

W. E. MAGILL.

ERIE, PENNSYLVANIA.

Current News.

HAVE you "seen" Dr. Crouse yet?

It will be necessary for you to do so if you want his assistance when that injunction comes for those crowns and bridges you have made.

Remember that in organization there is strength, and surely there never was a time when the profession needed to meet organization with organization as at the present.

The value of such a movement cannot be estimated. Its effects will be far-reaching. Let us stand by each other in the time of need, and success will surely crown our efforts.

We still continue the *special offer* of the November and December numbers free to all new subscribers who send in their names for 1890 before November 15, 1889.

ACCEPTING the "chemical theory" of caries, Dr. G. W. McElhaney traces the original cause back to the acid in the primeval apple eaten by Adam. Accepting the "germ theory," Dr. W. C. Browne finds it in the bugs and worms in the same apple.

With the bur in the engine the difference between live and dead bone is like cutting cheese and striking the rind. So says Dr. S. A. White.

THE "germ theory," at first ridiculed as the "bug" theory, the "worm" theory, etc., has come to stay, and in my mind fulfils all the requirements of a perfect theory and explains the hitherto obscure phenomena of caries more satisfactorily than anything which preceded it.

W. C. WARDLAW.

A PIECE of zinc placed in the vulcanizer prevents the flasks from soiling the hands.

W. C. Browne.

UNDER the title "Man and his World," the J. B. Lippincott Co. is to publish in a few weeks the matter of the philosophical lectures delivered last winter by Dr. Garretson. Gutekunst is preparing a fine photograph as a frontispiece for this volume.

UNION DENTAL CONVENTION.

The twenty-first Annual Union Convention of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York, will be held in Stancliff Hall, Elmira, N. Y., Tuesday and Wednesday, October 29 and 30, 1889. A programme of interest to practical every-day dentists has been secured, and the committee feel assured that every dentist within the borders of the several districts represented will feel a personal interest in the meeting. A large attendance is already assured. Persons desiring to make exhibits should apply to Dr. F. B. Darby, Elmira, N. Y., chairman of the Committee of Arrangements.

Myron D. Jewell,
Richfield Springs, N. Y.,
Chairman Business Committee.

UNION DENTAL MEETING.

The Connecticut Valley Dental Society, New England Dental Society, and the Connecticut State Dental Society will hold a union meeting at Springfield, Mass., on Wednesday, Thursday, and Friday, October 23, 24, and 25. Lectures, essays, clinics, and dental technics will make up the programme. All members of dental societies are cordially invited. Reduced railroad rates will be secured. Programmes containing all particulars of the meeting will be issued by October 15, and will be sent to any address by applying to

GEO. A. MAXFIELD, D.D.S.,

Secretary Connecticut Valley Dental Society, Holyoke, Mass.

Edgar O. Kingman, D.D.S., Secretary New England Dental Society, Cambridge, Mass.

Geo. L. Parmele, M.D.,
Secretary Connecticut State Dental Society,
Hartford, Conn.

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Original Communications.1

REFLEX EFFECTS OF DENTAL IRRITATION.2

BY ALBERT P. BRUBAKER, M.D., D.D.S., PHILADELPHIA, PA.

It is a truth no longer needing confirmation that the teeth, through the mediation of the trifacial nerve, are intimately associated with many, if indeed not all, of the organs of the body; that they are no longer to be regarded as inert structures lying on the outskirts of the physiological domain, and playing no important rôle in its activities. On the contrary, recent studies in physiology, and more particularly in pathology, have demonstrated the close interdependence of the teeth and other organs of the body, near and remote; and that, while in a normal condition, the teeth exert an influence upon the nutrition of the organs which is silent and inappreciable, yet, in a pathological condition, they often induce serious functional and organic lesions, the true cause of which is often wholly ignored.

To the experienced practitioners of dental medicine pathological states of organs, which have for their cause dental irritation, have presented themselves so frequently that reference to them may indeed seem trite. To the younger men of the profession, as

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¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read at the twenty-first annual meeting of the Pennsylvania State Dental Society, held at Cresson, Pa., July 31, 1889.

well as those who are about to engage in dental work, it may not be amiss to summarize what is known of the far-reaching influences of the disorders of the teeth, and to point out the necessity of studying the organism in its entirety, if they hope to obtain broad and general views of dental medicine.

I am impelled to allude to this last point, inasmuch as the observation is frequently made by students entering upon the duties of college life that systematic study of anatomy and physiology is largely unnecessary, and that time which might be employed more advantageously is practically wasted, much to the detriment of the student. The majority of students are possessed with the idea that all the anatomical and physiological knowledge necessary for the practice of their profession is bound up in that of the fifth nerve. But of what use even an exhaustive knowledge of this important nerve, unless it be considered in its anatomical and physiological relations to all other nerves, nerve-centres, and correlated organs?

The design of this paper is, first, to collate briefly the several hundred cases of disease which have been reported from time to time, and which had for their origin pathological conditions of the teeth and associated parts; and, second, to try to show from what is known of the connections of the fifth nerve with the nerve-centres at the base of the brain how these conditions may be brought about. Owing to the inconsequential nature of the nervous response to morbid irritation of the dental and alveolar nerves, no anatomical or scientific order will be attempted in arranging these cases, but I shall consider them in the order of their removal from the inciting causes, beginning with peripheral organs, such as the eye and ear, muscles, etc.; thence to the disorders of nerves and subordinate nerve-centres; and, lastly, to the diseases of the higher co-ordinating centres themselves.

Ocular Diseases.—That ocular disorders may be excited by morbid dental irritation is a fact which has been recognized only in recent times; but within the past few years the concurrent testimony of a large number of investigators point conclusively to this possibility. The causal relation between diseases of the teeth and eye has been shown to exist so frequently that no less an authority than Professor Galezowski, the distinguished French oculist, states that he makes it an invariable rule to first examine the teeth in every case that is brought to his notice. Every structure of the eyeball has been found to bear the brunt of the abnormal condition of the nerve-centres. A study of the cases so far reported will show that the majority are not inflammatory, but rather func-

tional, in character, such as might be expected to result either from over-stimulation or inhibition of nerve-centres. Nevertheless, it can scarcely be doubted that as both vaso-motor and trophic nerve-fibres, whose function it is to regulate the blood-supply and to govern the metabolism of the tissues, also pass to the eye through the ophthalmic division of the fifth nerve, any mal-arrangement of such fibres may give rise to inflammatory conditions.

There have been reported eleven cases of paralysis of ocular muscles, three cases of severe neuralgia of the eyeball, one case of copious lachrymation of one year's standing, twelve cases of inflammation and ulceration of the cornea and selerotic, twenty-two cases of partial and complete unilateral blindness, all of which had for their direct and exciting cause irritation of the teeth, as was shown by their disappearance upon removal of the irritation.

It has also been shown by Professor Schmidt that the power of accommodation—that power which the eye possesses of focusing the rays of light so as to form distinct images of near objects upon the retina—was impaired in seventy-three out of ninety-two cases troubled with dental caries. As a general rule, the defective accommodation was unilateral, and present upon the side of the dental lesion, though this was not invariable. It is quite evident that an unequal accommodative power would lead to great inconvenience in the performance of accurate work, and to the necessity of wearing glasses prematurely. Most remarkable are those cases of blindness of one eye, which have persisted for a period varying from a few months to twelve years, disappearing in a short time after the extraction of the carious teeth. It is questionable if any other condition is so prolific in the production of this form of functional blindness.

Aural Diseases.—That aural troubles are excited through reflex action from irritation of the dental nerves is also a truth no longer questioned. The fact has become so apparent as to be well recognized by aural surgeons. Thus, out of eighty infants under fourteen months of age examined by Dr. Wreden, of St. Petersburg, more than eighty per cent. had some form of ear trouble. Sexton, in reviewing his records of fifteen hundred cases, says he thinks "perhaps one-third owe their origin or continuance in a greater or less degree to diseases of the teeth." The same writer further says, "That in no case of dead (pulpless) teeth, however carefully treated and filled, can it be ever successfully demonstrated that a slight irritation is not constantly present, although no appreciable irritation may be experienced by the patient." Woakes, who

has written an admirable monograph upon ear affections, has accorded the fullest recognition to the dental origin of many ear affections.

Acute and chronic inflammations of the external and middle earchambers, both the catarrhal and purulent forms, often leading to complete destruction of the ear-structures, have been shown so often to be due to dental irritation that it is only necessary to allude to it. In addition to the numerous cases of inflammatory diseases that have been reported, at least eight cases of severe and protracted neuralgia of the auditory nerve, which had resisted all means of treatment except removal of the source of irritation.

Leaving out of consideration the half-dozen cases of temporary deafness accompanied by ringing noises in the ear, which had for their origin the same irritation, there is a far more serious form of deafness, first described by Dr. Cooper, of Dublin, which is a concomitant of severe and protracted eruption of the wisdom-tooth. It is a slow, progressive, and intractable form of chronic otitis, for the relief of which neither the extraction of the teeth nor any form of medication has been of any benefit. The irritation excited by the abnormal evolution of the tooth results in an insufficient innervation of the deeper constructures, and causes not a temporary, but permanent alteration in structure. If it could be demonstrated that these two conditions stand in the relation of cause and effect, we would have here another argument in support of the position taken by Professor C. N. Pierce at the last annual meeting, that the extraction of the sixth-year molar may at times be justifiable in order to prevent the development of serious troubles later in life. Especially would this be so in all those cases in which there is an hereditary predisposition to failure of hearing. It would at least eliminate one source of this distressing disorder. Considering the serious consequences that follow individuals deprived of their hearing, the possibility of this condition being caused by wisdom-tooth eruption should engage the attention of all dental surgeons. It can not be doubted that much deafness is a result of unrecognized troubles in early life; and as the condition of deaf-mutism is so often the sequel of ear-troubles, it is highly probable that the great number of these pitiable objects in charitable institutions might be lessened by so simple a matter as attention to the gums during teething.

Where the results of dental irritation are so disastrous as in organs so delicately organized and so complex as the eye and ear, how important it becomes for all dentists to familiarize themselves

with their structure, to be awake as to the possibility of dental irritation disordering these structures, as well as the means to avert such disorders! They will then do honor to themselves, to their profession, and at the same time relieve much distress and suffering.

Muscular Disorders.—Under this head will be considered only these instances of active contraction or spasm of voluntary muscles. With the exception of the ocular muscles, the only muscles known to be affected with spasm from dental irritation are the facial group, the masseter, and the sterno-cleido-mastoid. That these muscles should remain in this state of active contraction for an indefinite period without becoming exhausted is somewhat difficult to explain, but it is in all probability due to the fact that the muscular fibres as a whole do not contract simultaneously, but successively, so that while one set is in contraction another set is in repose. This explanation of the condition of these muscles receives some support from what is known of the sphincter muscles, in which this successive contraction of the muscular bands has been shown to exist. It is to be regarded as due to an incessant outflow of nerve-force from the centres kept up by the peripheral irritation.

Ten cases of persistent spasm of the masseter muscles have been recorded, three cases of spasm of facial muscles, and one case of wry neck. Although it is well known that the central origin of the motor nerves innervating these muscles are closely connected by commissural fibres with the origin of the fifth, it is wholly unknown why the peripheral irritation of the trigeminal branches should in one instance be transferred to the facial, and in another to the spinal accessory.

Visceral Disorders.—Neuroses peculiar to the alimentary canal, larynx, heart, and even uterus, arising as a sequence to dental irritation, have from time to time been observed by clinicians. That dental irritation should be reflected to these organs might at first glance seem remarkable, but it is not more so than that mental emotions should result in arrest of the secretion of gastric juice, or that ear-lesions should cause laryngeal cough, or that a blow on the abdomen should paralyze the heart. Turning to clinical medicine for illustrations of visceral disorders, we find that cases of obstinate vomiting, gastric and intestinal irritation, often accompanied by an intermittent fever, laryngeal irritation, palpitation of the heart, and even uterine pains, have been recorded from time to time.

TROPHIC AND VASO-MOTOR DISORDERS.—It is now pretty well established that in addition to the vaso-motor nerves which regulate

blood-supply, there are a number of centres and nerves which regulate the metabolism of the tissues. Injury to these nerves or impairment of their centres of origin give rise to more or less serious alteration in structure in various parts of the body. As instances of trophic disorders caused by dental irritation, may be mentioned ulcerations of the surfaces of the cheeks, ulcerations of the cornea, diseases of the skin, of which a number of cases have been reported. Dr. Mulreany, of New York, has been at great pains to establish a relationship between the irritation occurring during the eruption of the first four molar teeth and the appearance at that time of hip-joint disease. There would seem to be some truth in this view, inasmuch as the several cases that he records improved as soon as the irritation was relieved,—that is, as soon as the teeth had erupted.

Owing to want of time, I shall merely allude to the affections of the subordinate nerve-centres. These comprise, first, the various forms of neuralgia, chief of which is that of the fifth nerve, though neuralgia of the brachial and sciatic plexuses is far from being uncommon; second, various forms of paralysis, the most common of which is paralysis of the seventh nerve, or portio dura, leading to complete relaxation of the muscles of the face. At least ten cases of this affection have been recorded. Other paralyses, such as arm and leg paralysis, and even that most unfortunate form, infantile paralysis, have been observed to recover once the irritation of the dental nerves was relieved. Tetanus, four cases of which have thus far been recorded.

The affections of the higher nerve-centres comprise the various forms of headaches, epilepsy, chorea, hysteria, and insanity. Neuralgic headaches, of months' and years' duration, have yielded promptly after removal of impacted and carious teeth, exostosed roots, etc. Numerous are the cases which have been observed by both dentists and physicians. That epilepsy should be excited by dental irritation is at first sight rather remarkable, but it is no more so than that it should arise from any other form of peripheral irritation. Up to the present time some sixteen cases have been reported, all of which entirely recovered after removal of the irri-Chorea, especially that form limited to the face and shoulders, has been observed in a few instances only, but it is highly probable that a closer examination into the causation of this disease would show that the teeth are often important factors. Hysteria, hystero-epilepsy, and insanity have been caused in not a few instances by carious and ulcerated teeth in highly nervous and excitable patients. From what has been said, it is quite evident that morbid irritations of the teeth are capable of producing extensive pathological conditions in organs near and remote, and that the sphere of the dentist will widen if looked at from this point of view, and will become a valuable ally in the elucidation of many obscure and perplexing problems of clinical medicine.

The explanation of the mechanism and derangement of mechanism by which the pathological states resulting from dental irritation are brought about is a problem much more readily stated than solved. Its solution requires a knowledge of the anatomy and physiology of that complex system of sensory, motor, vaso-motor, and trophic nerve-fibres by which the peripheral organs are harmonized and co-ordinated in their physiological action. The fundamental action, however, is a reflex action, the mechanism of which is quite simple and generally well known. From an irritated point a centripetal influence passes inward to a nerve-centre, from which another impulse travels outward, which excites activity in a muscle, a gland, or other tissue. In the spinal cord and medulla oblongata there are innumerable centres from which nerve-fibres pass to all structures about the head and trunk of the body. These centres are in function, motor, vaso-motor, secretory, trophic, etc., and many of them are in direct anatomical connection with the origin of the fifth nerve. If this or any other sensory nerve be abnormally stimulated at its periphery, the nerve-impulses thus generated travel inward to the centre of origin of that nerve; from thence it may pass in various directions to other centres, according to circumstances of which we know nothing. For example, an impulse reaching the spinal cord or medulla oblongata may be reflected to a motor centre, and the result will be increased contraction of a muscle; or it may be reflected to a blood-vessel, and the result is a variation in the blood-supply, or to a gland, and increased secretion results. In all cases there is an increase in the quantity of nerve-force sent outward to these various structures, with the result of largely increasing their activity. Sometimes, however, the impulse which travels inward produces the very opposite condition of these nerve-centres, produces a condition of inhibition or rest, no nerve-force passing outward. The structures normally innervated by them are paralyzed, and often undergo a change in nutrition. In this way we may explain the forms of paralysis that have been mentioned.

Again, the nerve-force generated at the point of irritation, after travelling inward, may neither be reflected outward, nor produce

inhibition of nerve-centres, but it may be stored up in the higher centres until morbid conditions arise, which manifest themselves as headache, epilepsy, insanity, etc.

It is clearly evident that as long as the stimulation of the dental and alveolar nerves is of a normal character, the resulting reflex influences are such as to insure a healthful activity of the organism; but when this irritation becomes painful or morbid, the normal mechanism is deranged and pathological processes incited. Any attempt to trace out specifically the mistaken routes of the nervous currents, the reason of their deroutation, and the rationale of the disordered process is, in the present state of neurology, either impossible or highly unsatisfactory.

To help our minds, we may crudely picture the central nervous system, and particularly the medulla oblongata, as a sort of intricate switch-board of a large telegraph-office, where are focalized myriad wires from all parts of the compass. When in normal action the connections are such that a message from a peripheral point—for example, the dental nerves—is shunted to its proper receiver, transferred to another wire, or sent to higher and other offices. Most of the pathological instances referred to appear to be a result of a disordered condition of the switch-board, the medulla, the result of morbid messages from the periphery. As to any adequate conception or comprehension as to the workings of the medulla in health or disease, we are very much like an individual wholly ignorant of and standing before the switch-board of the unheard-of telegraphic machines.

If what I have said will convince any one of the desirability on the part of dentists of acquiring a wider knowledge of anatomical physiological and pathological knowledge, my object will have been obtained.

TWO INTERESTING CASES.1

BY L. C. TAYLOR, D.D.S., HARTFORD, CONN.

Two years ago I presented models to many members of this society (Massachusetts), asking their advice as to the best method of treatment. The history of the case is as follows: The patient, the daughter of a well-known clergyman, was very desirous of securing the best cosmetic effects, and did not wish the pulps destroyed, if it were possible to save them alive. She said that she had consulted several other dentists, who had advised "letting alone or cutting off and crowning." The deformity, caused by a serious illness occurring previous to the second year, consisted of abnormally short superior central incisors. These teeth, when erupted, were imperfectly formed, and soon after decay set in, the pits of which were mostly located near the cutting edge. The cutting edges gave way, and the teeth were shortened fully onethird their normal length. The deformity was further aggravated by an unusually long upper lip, which gave the patient the appearance of having lost her front teeth. In ordinary conversation they did not show at all. When the case was presented to me, the decay had ceased and the pulps were alive and healthy. A cast, taken at that time, shows more plainly than can be described the condition of the mouth when I first saw the patient. (See Fig. 1.) The

laterals had not made their appearance, but the space had nearly closed on the right side. I at first thought of drawing the centrals down, but gave the idea up as impracticable, and finally decided to put



shell-caps on the two centrals, and fill the space left by the noneruption of the left lateral by inserting an artificial clasp plate. This tooth might have been attached on a bridge to the central, but I was afraid of loosening it, as we did not know positively how well the roots were developed, the faulty development of the erown leading to the inference that the root might have been similarly affected. The operation consisted in bevelling off the natural

¹ Read at the semi-annual meeting of the Massachusetts Society, Boston June 6, 1889.

tooth as much as was safe without approaching too near the pulp. We then took an impression, and made a metal die, to which gold caps were fitted, extending well up under the gum. We then selected some of Ash's plate teeth with long pins, grinding out that portion above the pins until quite thin, and apparently well fitted to the face, then bevelled off the tooth, allowing the pins to come to the gold cap over the natural tooth. We then ground the end and face of the artificial tooth until apparently about right, soldered it to cap, and finished with pure gold band around sides to make good joints. We next cemented the crowns to the natural teeth with oxyphosphate; finding them a little long, we still further ground from face and ends, after which we polished the face of tooth. We are indebted to Ash & Sons for teeth that enable us to do this kind of work, as they can be finished in the mouth. The work, as completed, is shown in Fig. 2. The dotted lines show how far up the



porcelain face extended. I believe the expression is about perfect. The object we had in view was to save the pulps of the teeth. These teeth are now alive and as healthy as any in the audience. I do not believe we are justified

in destroying the pulps of teeth where it is possible to save them alive.

The second case was that of a young patient, eight years of age, with the tip of a central incisor broken off. It is an instance where ossification is somewhat in excess of ordinary cases. This (presenting the broken portion of natural tooth) shows you just how much was gone. The pulp was not exposed, owing to excessive ossification. This tooth was treated in the same way as the previous case; and while the operation may be criticised, it seemed the better thing to do, as we are all well aware that, as the root is not fully formed at the age of eight, it must prove almost anything but satisfactory to destroy the pulp.

TREATMENT OF EXPOSED TOOTH-PULPS, WITH A VIEW TO PRESERVATION.1

BY JAMES S. KING, D.D.S., PITTSBURG.

I have concluded that I could the more intelligently and understandingly present the sum of my thoughts and the small accumulations gathered from my experiences in relation to the subject I have chosen by giving in brief detail a definite statement of the manner of treating exposed tooth-pulps which for almost a score of years I have employed in my practice. I also purpose giving a brief account of the method of treatment I have been pursuing in those cases in which the tooth-pulps are on the verge of that condition called absolute exposure.

In order to attain an average success in operations which have for their ultimate object the preservation of vitality in exposed tooth-pulps, the first step to be taken is to provide the needed remedies and materials. In my practice these are few in number, -viz., wood creosote, zinc oxide, iodoform, paper treated in zinc chloride, and crystalline cement. A correct rule of practice in the treatment of exposed tooth-pulps is that all necessary preparations of the eavity of decay should be brought to a finish, with rubberdam in place prior to placing within the cavity the materials intended for the protection of the pulp. In preparing the remedies and materials I have named for use in pulp treatment, my first move is to combine with wood creosote a portion of zinc oxide in amount sufficient to form a somewhat stiff paste. Then the rubberdam being in place and the cavity properly prepared, I take a general view of the exposure and surroundings, in order to determine how large or how small I shall cut the fragment of paper for immediate use, the diameter of which should be such as to permit of an overlapping to some extent of the dentine that forms the border of the exposed orifice. Then on one side of the paper I put a small portion of creosote paste, and with a pair of delicately pointed foil-pliers seize the paper, apply that side to the point of exposure, and in a gentle manner press the paper into the desired position, being careful to prevent the formation of air-bubbles. I now proceed to cover paste and paper with a coating of phosphate

¹ Read at the twenty-first annual meeting of the Pennsylvania State Dental Society, held at Cresson, Pa., July 31, 1889.

cement. Recently a friend suggested to me the use of Weston's non-irritant cement, as being a better article on account of its non-irritating qualities. On either of these cements any character of filling can be placed, thus completing the operation. Much depends on a correct diagnosis of each individual case, prior to engaging in the labor of pulp-treatment. Any case presenting undoubted evidences of inflammation and congestion or strangulation of the pulp should not be treated in the manner I have just pointed out.

A few words now in relation to cases in which absolute exposure of the pulp has not taken place, cases in which the film or septum of dentine remaining in place between the cavity of decay and the pulp-tissue has become very thin and sensitive. This condition is often met with in practice, and in some instances it causes much annovance and discomfort to the patient subsequent to the operation, unless the prospective trouble is properly guarded against prior to the insertion of a metallic filling. It is well known to all who have had an average experience in dental practice that toothpulps not actually exposed do in some instances lose their vitality, as a consequence of their nearly exposed condition. This result in some instances may arise from the action of the thermal changes that are ever occurring in the bodies of large metallic fillings. In all cases in which I am led to believe or even to suspect that there exists an unsafe condition of thinness in the dentine between the cavity of decay and the pulp-tissue, I at once make use of creosote paste and chloride paper. I cut the paper in such form and size as will permit a little overlapping of the margin of the thin dentine, thus affording ample protection to the thin septum of dentine and to the underlying pulp. When it is my purpose to finish an operation by the use of gold, I place over the paste and paper a portion of phosphate cement, to serve as a base for my filling. In some cases, however,—for instance, a superior lateral incisor, or inferior central or lateral, in which there is not sufficient space,-I do not use the cement. I apply the gold in direct contact with the paper. I do the same in some instances in which I have absolute exposure of the pulp, and also in a majority of cases in which I use amalgam. I employ cement only in large cavities wherein pulp-exposure is correspondingly large. Cement is required in order to avoid undue compression of the pulp. Frequently cases are met with in which there is present a high state of inflammatory action and congestion of the pulp-tissue, and while actual strangulation of the pulp has not taken place, yet the vital forces are seemingly crowded near to the verge of dissolution, when possibly there may be inherent within the body of such pulp a vitality sufficiently strong and active to respond to the action of the restorative and curative agents made use of. If in my judgment I have before me a combination of symptoms like those I have enumerated, I at once make ready the cavity for treatment of the pulp, by removing the decomposed tooth-substance, and washing the cavity with a pledget of cotton wet in wood creosote. I now combine with creosote paste a little iodoform, and, applying the mass to the exposed pulp as in ordinary cases, fill the remainder of the cavity with cement, and dismiss the patient for two months to await results.

COPPER AMALGAM.1

BY JULIAN W. RUSSELL, M.D.S., BROOKLYN, NEW YORK.

THE rapid rise of copper amalgam in this country during the past eighteen months has been simply marvellous. In order to show how great this is, I have endeavored to gather all the facts possible in regard to the quantity used. Two years ago there were not more than two hundred ounces used per year in this country. Last year the consumption was about four thousand ounces, and this year the demand will approach ten thousand, or nearly ten per cent. of the total amount of alloy and amalgam consumed in the United States. Though used abroad for nearly forty years, it seems singular that so little should have been employed in this country until so recently. The craze for it—for we may call it so—has been equalled only by that of cocaine of three years back, though with this difference, the demand for cocaine rapidly diminished, and that drug is now used in comparatively few offices. The yearly demand for copper amalgam, however, will not increase much more than the amount that I have estimated, neither will it diminish, but will, I think, hardly change for years to come; for though some have abandoned, and others will abandon, its use, yet there are still others who will take it up, and so the demand will remain about the same.

Unfortunately the craze for copper amalgam, like some of the other fads that have afflicted the dental profession during the past few years, has caused this material to be employed to excess in a great many cases; and, though some of its most ardent admirers

¹ Read before the New Jersey State Dental Society, at its nineteenth annual session at Asbury Park, July 18, 1889.

maintain that it is the only material to use, yet during the next year we shall hear of so many failures that even these will have to change their minds, and admit that it must be used with discretion, and the word "discretion" is the one that I wish particularly to emphasize. Copper amalgam, employed with discretion, is undoubtedly one of the best materials that the dentist can make use of to preserve the teeth. But how many employ it in that way? Very few, as yet, I regret to say. Their own failures, however, will soon teach them, and they will in the course of time understand the meaning of the word discretion.

It is a curious fact, and one that illustrates the great difference between this country and Europe, that though they have been manufacturing amalgams for so many years, yet the material they make abroad to-day is precisely the same that they made forty years ago. And whilst the American amalgams are not yet two years old, yet the improvement in their manufacture has been so great that we can now export them to the countries of their birth, though sold at a far higher price. Let any one try the various amalgams and note the vast difference between the foreign and the domestic. The foreign article is, as a rule, very dirty, coarse-grained, and contains about seventy-five per cent. of mercury; and whilst some of the American are precisely like these, yet there are others which are as clean and pure as it is possible to make them. is especially true of those that are made by electricity. there are some amalgams which contain a large surplus of mercury, there are also others which have only about twenty-five per cent. of this substance.

The old method of manufacture was by precipitating the copper from its solution of sulphate, either by means of iron or zinc plates or bars. There was no way of controlling the size of the grains of copper, and the result was that some would be very fine, whilst another lot would be as coarse as white sand.

The newest and best method is precipitating by electricity generated by a dynamo. By regulating the current the resulting amalgam may be made so fine that in rubbing it between the fingers it will feel like satin. The plant is very expensive, and requires an expert electrician to run it. But in time, I think, all copper amalgam will be made in this manner, as the resulting product is chemically pure.

Some time ago an article on copper amalgam, written by Dr. St. George Elliott, of London, was extensively copied by the journals in this country. He gave the results of a number of experiments

made by him with alloys and copper amalgams, the experiments not resulting favorably to copper amalgam. The great mistake he made, I think, was in beating the amalgam until some of the copper was oxidized; this would result in making it very brittle, and so it could not compare at all favorably with the alloys which he tested at the same time. Another was that the article was coarse-grained, and hence these experiments are of little service to us who use an entirely different article.

He also said that around a great many fillings the tooth-substance would soften. I have noticed this only when the amalgam was made by what is called the zinc process. In making it in this manner a certain percentage of zinc is unavoidably incorporated into the amalgam, and when placed in the tooth and moistened with saliva it seems to generate a small quantity of electricity, the filling acting as one pole of the battery, and the tooth the other. The result is a gradual dissolution of the tooth-substance around the margin of the filling.

Iron as an impurity does not appear to give this result. Zinc has also the property of making the amalgam quick-setting. A certain test for it is to mix up a quantity of the amalgam with a considerable surplus of mercury, making the mass so soft that it will not retain its shape when rolled into a ball. If this should get hard in the course of two or three hours, it denotes the presence of zinc. If there is no zinc, the mass will remain soft for a whole day.

I have heard many believers in this material assert that many of their fillings do not tarnish, but keep a bright silver color, like an alloy. These are the very eases that will result in failures in the course of time, for a copper amalgam filling retaining its brightness is a sure sign of a highly acid condition of the secretions, and these fillings are slowly dissolving. If examined after a few months, they will be found scooped out in all directions, exposing the margins of the cavity and forming a recess for fresh decay. The only remedy for this is to remove a portion and refill with alloy or gold. When, on the contrary, the filling turns black or dark brown, then it can be left alone with perfect safety, and with the knowledge on the part of the operator that it will preserve the tooth for many years.

Dr. Rollins, of Boston, recently related to me a case in which he inserted a filling that weighed forty grains; two years afterwards he removed it and found that it weighed only twenty grains. The rest had been dissolved by the acid secretions. When an operator desires to fill a large number of cavities in one mouth, the best plan

to pursue is first to insert one filling, and let it remain two or three days; if at the end of that time the filling has turned a dark color, the remaining fillings can then be inserted; but if, on the contrary, it still remains bright, he had better use some other material. The best places to use this material are in the deciduous, the wisdom teeth, and in teeth of a soft chalky character, where nearly all other filling materials fail to preserve them. In filling deciduous teeth it is not necessary to remove more than the decay around the margin; thus the danger of exposed pulps is avoided, and, as amalgam is less of a conductor than alloy, it can be placed in very sensitive cavities without causing irritation. One of its peculiarities is the perfect adaptation to the walls of the cavity, neither shrinking nor bulging: and cavities under the margin of the gum can be smoothed so thoroughly with a burnisher that a subsequent finishing is unnecessary. It is particularly adapted to cavities in the buccal surfaces of the molars. Especially is this the case with wisdom-teeth, which the brush seldom reaches, and which, when filled with alloy, decay rapidly around the margins. Where it is impossible to keep the cavity dry, amalgam can also be used, only then it will darken the tooth, from the oxide formed by the moisture. In dry cavities, however, there is no discoloration, and this allows it to be placed behind thin walls of enamel. It is also useful in repairing old fillings of gold or alloy, where they are undermined by decay, but are too good to be removed. Crowns can be moulded from it, and fastened to roots by means of pins and a thin mixture of amalgam. A number of operators have said that it is impossible to join an alloy and an amalgam filling when they are soft. Some alloys will join very readily, as I have proved by filling one-half a glass tube with alloy and the remainder with copper amalgam. When hard, the tube was broken, and it was impossible to break them apart at the joint.

Copper amalgam is also useful in combination with gold at the cervical wall, but it is preferable first to fill that part with the amalgam, allowing it to harden for a day, then drill your retaining points and fill with gold. Where the dark color is an objection to copper amalgam, a few pieces of gold can be burnished over the surface when it is soft. The gold will take up the surplus mercury, and when finally finished the filling will be of a gold bronze color.

In preparing this filling for the cavity, take as dry an amalgam as possible, heat it slightly until the mercury just appears on the surface, place in a mortar, and grind very rapidly. The friction will soon render the mass very soft. Place in the palm of the hand

and pat it gently until the whole mass is amalgamated. Sometimes it may be necessary to warm it again. If wanted to set rapidly, squeeze through a napkin with a pair of pliers, for the more mercury extracted the quicker it will harden. More care is required in filling cavities with this material than with alloy, but when used with the precautions that I have indicated the results are very satisfactory.

In conclusion, as to the future of copper amalgam, I believe that it is an excellent filling material, and that in time it will be found in the office of every careful, conservative dentist.

EXTENSIVE REMOVABLE BRIDGE-WORK.1

BY J. MARION EDMUNDS, D.D.S., NEW YORK CITY.

THERE is not a branch of any profession so exacting in its requirements upon the skill, taste, and judgment of the operator as dental prosthesis. Ranking, as prosthetic dentistry does, with the higher branches of fine art, we need not be surprised, when we refleet how little it is valued by the average dentist, that there are so many failures and so many pieces of unsightly work; for mechanical dentists are many, and dental artists few. Our casual observations on the street, beach, in the drawing-room, and at our office in everyday practice is all that is necessary to verify these statements. Here these disgraceful productions of the dental mechanic are only too frequently seen in the mouths of the confiding unfortunates. With the advantages of the present at his command, it is not only possible for the dental artist to replace missing teeth with such perfection as to deceive the closest observer, but also to restore all the lost symmetry of the face, and thereby to bring back the youthful expression, long since passed away.

The development of the past fifty years is truly marvellous. Fifty years ago dental prosthesis had just advanced from a curved ivory denture to a swaged gold plate with porcelain facings in place of the human and ivory teeth. A few years later, after the invention of rubber, and when competition among the dental mechanics became greater for something cheap, rubber was adopted as a base for artificial teeth, and it produced even cheaper dentures than had been anticipated by the most sanguine charlatan. But, thanks to the few brave ones who held the standard of our

¹ Read before the New Jersey State Dental Society, at its nineteenth annual session at Asbury Park, July 17, 1889.

profession high and ever worked for advancement, with each renewed effort some great result was achieved. When Dr. Bing, of Paris, conceived the idea of attaching one missing tooth to two remaining teeth, by soldering a piece of gold wire to the back of an artificial facing, and building it with gold foil into cavities, either natural or artificial, then the genius of the American dentist was called upon to improve and advance this idea to a height so sublime that the original is lost in obscurity. Drs. Webb, Beers, Low, Starr, Evans, and Brown have all contributed much to advance this new era in denistry,-Dr. Webb improving on Dr. Bing's method, Dr. Beers inventing the gold cap, Dr. Low soldering one or more facings to these gold caps and forming what is known as the Low bridge. Dr. R. Walter Starr, of Philadelphia, to my mind made a decided improvement on the Low bridge when he invented the removable bridge, which had many advantages over all other kinds of bridge-work. My object has been, since I commenced this new, beautiful, and most useful method of prosthesis, to extend its sphere of usefulness as far as possible, and to-day I have the pleasure to present to this society an original method which has given my patients and myself the most gratifying results.

As esthetic prosthesis is the standard "par excellence," all factors in the process must work to this end. The size and color of the teeth should correspond with the age and temperament of the patient; the material used as a base in the construction should be as near the color of the natural tissue as possible.

As the soft tissues and membrane play an important part in the support of this process, they must be examined with care; and, before putting on a cap or inserting a bridge, any deviation from the normal should be treated with remedial agents until health is fully restored. The next step is to make another cap to telescope over the one already in place. Then take an impression of the toothspace, and of a few of the teeth in front of the space that is to be filled. From this impression run a model, and cast a duplicate of zinc in sand; then run a counter-die and swage a narrow rim of gold plate to rest on the gum as a saddle. This must now be placed in position on the model, the outer cap waxed in place and soldered there. This accomplished, it may be placed in the mouth, the bite taken, the teeth waxed in position and articulated. The model should be scraped so that the saddle may fit firmly upon the gum. This is done to allow for the expansion of the plaster, otherwise there might be an injurious strain on the tooth supporting the bridge. If from absorption there should be a deficiency or falling in of the buccal walls, the natural expression can be restored by carrying the gold plate well up on the buccal walls of the alveolar ridge, adding wax where the deficiency has occurred.

The advantages of having merely a gold rim held firmly in contact with the gums, covering only the alveolar ridge, held there by the laws of adhesion and mechanical force, and removable at the will of the patient, are obvious. Counter-sunk teeth are invariably the best substitute, resembling as they do the natural organs, and affording the patient a more perfect enunciation and articulation than can be obtained in any other way. I have inserted two full upper dentures which are giving perfect satisfaction. My first case was that of a lady who had been wearing for ten years a full upper plate, with the exception of two superior third molars. The alveolar ridge around these was almost completely destroyed. I could pass a probe from the margin of the gum to at least three-fourths the length of the root. The teeth were so loose that it seemed absurd to think of saving them. The tissue of the entire arch was also badly inflamed. This plate did not fit the arch or articulate with a single tooth. The lower teeth, eight of which were in the anterior part of the inferior arch, were allowed to occlude on the plate threeeighths of an inch posterior to the corresponding superior teeth. There was a strip of gold vulcanized on the plate to prevent the inferior teeth wearing through the rubber. You can well imagine what a severe expression the shortening of the bite gave, adding to this the extension of the upper teeth and lips in the manner previously stated. Without describing this artificial deformity further, I will only say I have seen few worse caused by freaks of nature. After considerable persuasion on the part of the patient to save the two remaining molars, and insert a bridge if possible, I decided to try. Removing the tartar and débris thoroughly, I used aromatic sulphuric acid, half-strength, on pledgets of cotton, packing them as close to the walls of the socket as I could, and allowing them to remain for two hours at a time. This treatment was continued for a week. Then, after scarifying the tissue with a small burr, treatment was continued for one week longer, with injections of peroxide of hydrogen and iodide of zinc. By this time healthy granulations had appeared and the teeth were firmly set. I then prepared the teeth and capped them, and in one more week inserted full bridge constructed as previously described. This case has been in the mouth thirteen months, the patient wearing it with great comfort, whilst the remaining teeth are nearly firm, notwithstanding they support a full denture.

Reports of Society Meetings.

PENNSYLVANIA STATE DENTAL SOCIETY .- (Continued.)

THE YOUNG PRACTITIONER.

BY J. C. WHITE, D.D.S., SEWICKLEY, PA.

It was with the greatest reluctance that I finally consented to occupy a small portion of your valuable time in the reading of a paper. Much more should I have enjoyed myself, had I been privileged to sit in this convention, a guest and an appreciative listener; not because I want to shirk the work, for a man who is not willing to give some of his time and energy to uplifting the standard of our profession does not deserve the honor that is conferred upon him when he is named as a member of a society.

It would be presumptuous for me to discuss a subject with the idea that it would give enlightenment to my fellow-practitioners. My experience has been far too limited for that; and yet, limited as the time has been, I have been enabled to observe a number of things of which I was entirely ignorant until I began to practise. From the time a young man opens his office the critical eye of the public is upon him, ever ready to pick out his imperfect points, which, as we all know, at this time are very numerous; and, on the other hand, they are very reluctant to laud him for what he is too apt to think was a most remarkably skilful operation. It is true, the operation may not have been a difficult one, and if an older man had performed the same, he might not have thought it anything more than every-day practice; but with the young man it is different, and though all others fail to see what he considers a good point, he does not, and will be so pleased over his success that he will be frequently found talking about it, much to the disgust of those with whom he comes in contact, to say nothing of the annoyance caused the one upon whom the operation was performed. Above all things, the operator should refrain from talking about his patients. Not infrequently we find the narrow-minded rival looking upon and treating his young colleague as though he were an intruder and it was very audacious for him to think of locating

near him without first consulting His Royal Highness. Do not think, gentlemen, for a moment that I consider this the general rule. By no means. I say occasionally you find this, and I am glad to say it is principally confined to small towns. In the city and among the more educated class they are found to be much more congenial. Education and broad-mindedness go hand in hand. There is no room for doubt that the young practitioner frequently thinks his education is far more extensive, and that he is infinitely more skilful than his fellow-practitioner. In fact, he is so far advanced when he receives his diploma that the different meetings of the local societies and the State dental societies are looked upon by him as intended solely for the older but less educated men of his profession. Then comes the "quack," with his large gilt sign hung half-way across the sidewalk,-"Teeth extracted and filled without pain; plates made and inserted while you wait; best plates only five dollars." All of this is, of course, disgusting to the better class of our profession, and a great amount of work comes to us after the patient has been in the hands of these men. Their work is not only injurious to the patient, but it conveys a wrong impression upon the public in general, and we of course suffer from it. The work we build up they tear down; the good we may do they undo, and so the seesaw is kept up.

But why is it we have so many "quacks?" When do they become so, and how is their number to be lessened? Is it when they have been in practice a number of years, and have succeeded in building a good practice among the better class of citizens, or is it in the early days of their practice, when they are ambitious, not so much to do good work among the better class as to get a great number of patients regardless of the class? This seems to be the height of their ambition. No; I hold it is a rare exception for one to depart from the legitimate practice of a dentist after he has been in practice a number of years; it is when he first starts out on his professional career that he is at all inclined to advertise extensively, and thereby get a large practice.

Then, the "quack," while he may have little or no effect upon the practice of the older members of the profession, has a decided effect upon the young dentists. It should be the aim of every man to do honest work, never allowing himself to become so hurried that he will slight in any particular the work he has undertaken. This I take to be the principle upon which each young man starts out, to spend the time necessary to do this work faithfully. He must charge a sufficient amount to justify him for the work he has

done. His views and those of his patients will frequently differ widely on this point, the young man holding tenaciously to the point that if his work is done as good as it is possible to do it, he must be paid as much as his more experienced colleague.

The patient, on the other hand, uses the silly argument that he must wait until his hair is white with age before he thinks of charging such a figure. "Why," says the patient, "I can go across the way, to Dr. -- "(doctor, by the way, is so frequently misapplied in these cases that it almost makes me long to be called mister again), "and he will do the work for one-half or one-third what you ask." Then the young operator must explain the why and wherefore of this; and, although his arguments may be very good, it is not always sufficient to convince the average patient until after he or she has been through the hands of the neighboring quack. We are glad to say this, however, is almost invariably sufficient to convince one that he would have been better off if he had followed the advice given. While I strongly advocate the theory of a young man charging a good figure, I caution him against excessive charges. In this he should be as honest as he is in his work. Now, gentlemen, since the quack has come, and since it is the young man who begins this practice, is it not our duty, would it not be to our advantage, to keep a closer eye upon the younger men of our profession?

The time has come when no undergraduate is permitted to practise in our state; and yet, sad it is to relate, the graduate himself is often found lowering the dignity of his profession to that of a trade. I do not overlook the fact that many who start out with little or nothing feel that they are compelled to advertise in order to get a start in the world; then, when they have once started in this way, and find that the peers of the profession in their locality pay no attention whatever to them, do not advise them against their course, and they are not invited to join the local societies, they lose all hope of ever becoming identified with these men, and finally are satisfied to remain where they have started. No, gentlemen; while the young man who becomes a quack is largely to blame, the responsibility rests somewhat on the leading members of the profession.

After graduation each young man should be induced to join some good local society. If this is run properly and he receives sufficient encouragement, there is little danger of his ever becoming a quack. Do not think I speak from personal experience; I have every reason to be grateful for the encouragement and good-will I

have received at the hands of my fellow-practitioners. I feel a life-long indebtedness to the members of the Pittsburg Dental Association for the kindly manner with which I was received into their midst, but I feel others were not so fortunate, and it is for these that I intercede.

Not only must we educate our patients to the fact of the importance of our work and of the vast improvement that has been made in our profession, but we must teach our own young men that we are no longer the "tooth-pullers" of a few years ago, but that we now pose as the tooth-savers of the nineteenth century. We are no longer classed among the tradesmen of our country, but have risen to the rank of a scientific profession. Its future success depends not upon the man whose hair has grown white in the service of his profession; whose eye is dimmed with the approach of old age; his work is almost done. It has been the labor of such men as these that has placed the standard where it now rests, but its future success remains with the young.

DISCUSSION ON DR. J. C. WHITE'S PAPER ON "THE YOUNG PRACTITIONER."

Dr. J. C. Green.—A few of us can remember the time when the "tooth-pullers" in the small villages looked at each other as they passed along the street, and did not want to see one another. They would not recognize each other. I have some reason to remember something of this kind; and when I commenced the practice of dentistry, a few years ago, I made it a point to see that every young man who came into our town was taken by the hand and welcomed. I pursued that course, and to-day every man that has come into our place is a particular friend of mine. They are all nice men, and in our little town of several thousand inhabitants we now have seven or eight dentists, and every man is a graduate. Occasionally a man drops in, not wanting to see you. They fear the advancement. The old idea was, "I do not know you, and don't want to see you." Now the idea is to take hold of every man and encourage the young men, and I fully endorse what the essayist has said, that the older men must encourage the younger.

Dr. L. A. Faught.—I can fully endorse the paper that has been read, but wish to add a few words. There is a relationship which the young practitioner holds other than as a practitioner of dentistry in the following of his calling. I think it is not unfrequently the case, even at the present day, that when one patient goes from one

operator to another, and sees an older member into whose hands he has passed, and says this work was done by so and so, what do you think of it? he does not express an opinion favorable to it. When told the dentist's name he says, "I do not know him." When he meets that gentleman down-town, however, he says, "How do you do, doctor?" He does know him. It is a relationship that ought not to exist.

There is another relationship, the one the young practitioner holds to dental meetings. We cannot expect the work of older men to continue on indefinitely unless we have new blood. We cannot expect to engraft that just when we need it. We must bring them in, encourage them, and make them feel they are of importance upon the dental floor. If we could do that, when the older members who have been the life of the society drop the mantle, it will then be taken up by those who have become imbued with the work. As an illustration of this, seven out of the nine papers here are prepared and read by young men,—men whose names, with one or two exceptions, have not appeared in the society. They come here, and we have encouraged them, and I am sure that at this stage of the meeting we can all attest that the papers have been well presented, and there has been that friction that brings out the truth. We have an evidence of the good of that kind of work.

Dr. H. E. Roberts.—Regarding helping the young practitioner along, a great deal depends on the young man himself. It was brought to my mind very forcibly a short time ago. One of my college class-mates was a lady. She came to me a week ago, and said, "I am not treated right in any way." I said, "Well doctor, have you gone around and tried to mingle with dentists?" She said, "No." I said, "You do that, and see if the dentists do not give you a helping hand." A little while afterwards I found her name on a committee on some dental work, and it was all right with the dentists. I think as much depends upon the young men as the help from the older ones. It should be mutual. No one is more willing to help the young practitioner than I am.

DISCUSSION ON DR. A. P. BRUBAKER'S PAPER ON "REFLEX EFFECTS
OF DENTAL IRRITATION."

Dr. L. A. Faught.—I am delighted that we have a paper of this class to bring before the association. We cannot too highly impress upon the minds of all, old and young, the necessity of being familiar with the anatomical, physiological, and pathological rela-

tions of the nervous system and the teeth. There is much yet to be learned in this respect. I am thoroughly satisfied, from what little knowledge I have of physiological conditions, what a great benefit it has been to me in the treatment of cases that have come under my care. The more extended our knowledge the better we can serve our patients. What I wish to say is entirely commendatory of the paper brought before us.

Dr. E. C. Kirk.—It is not necessary for me to add anything by way of endorsement of the paper; I fully concur with Dr. Faught. I want, however, to call attention to a few cases in this line which I think will bear out the views of Dr. Brubaker. I had a boy under my care for the treatment of his teeth. About six months afterwards, when all question of dental irritation from that source was eliminated, he was suddenly taken one day at table with an attack of lockjaw,-spasmodic. He was brought to me twenty-four hours afterwards by his mother, and his family were particularly alarmed, for he was having these attacks repeatedly every two or three weeks. In connection with his family physician, I tried to discover some cause of irritation. I found that the second bicuspid on the lower left side had not erupted, and could not possibly get through, because of lack of space between the sixth-year molar and the first bicuspid; as I recollect, the sixth-year molar was devitalized,-at least it was defective, -and my advice was to extract it, and thus give room for the bicuspid to crupt. Under ordinary circumstances I would not have extracted it. The sixth-year molar was extracted, and the second bicuspid in the course of time came through and filled up the space reasonably well, and his attacks of lock-jaw ceased almost immediately after the extraction of the molar. Whether it was the sixth-year molar or the mal-erupted bicuspid I don't know; at any rate a cure followed extraction.

In the earlier part of my practice one of my first cases,—and one which made an impression upon me—was that of a girl, who came into my office suffering with pain in the sixth-year molar. It was absolutely without defect, except a slight cavity in a sulcus. The pain was definitely located in this tooth by her. She also had pain in the ear,—acute otalgia,—and she was frantic in her demands that the tooth should be removed. I told her it was not the source of her trouble. I did not know as much about the subject then as now, but I thought it was neuralgia from some source situated near that tooth. She was evidently suffering terribly, and I said, "As long as you are sure it is this tooth, I will destroy the pulp and not extract it." This done, however, the pain continued. I then did what

should have been done at the commencement,—went over each tooth and examined every surface. I had gone completely around the upper jaw, also the lower, until I came to a wisdom-tooth partially through. I passed a probe over the crown, examined the distal aspect, and discovered an exposed pulp. The tooth was extracted and the pain ceased.

At another time I had brought to me a lady who was suffering with a chronic middle-ear catarrh. As I was talking with her husband in regard to reflex dental disturbances, he said, "I thought the matter had some dental origin." The upper and lower wisdom-teeth on that side were in position, and perfectly sound. My experience, however, in a number of cases led me to look upon these teeth as a source of much ear-difficulty, particularly catarrhal, and, as they were of no value to her, I advised extraction, thinking possibly there was some growth upon the roots,—exostosis. I extracted the two teeth, and found them both extensively exostosed, and the cure of her catarrhal difficulty followed immediately upon their removal,—hearing being restored almost immediately after extraction.

I reported quite recently in the Cosmos a case of an impacted cuspid tooth, where coincident with this neuralgic difficulty was a defect in the ocular muscles, leading to divergent squint. I could trace no relationship between the tooth and the eye difficulty, and considered them as merely coincident, but the eye trouble was removed by extraction of the tooth.

I have been led to believe that the acute attacks of otitis children have at the period of eruption of the permanent teeth are largely due to dental irritation from the breaking down of the deciduous set, or exposure of the pulp, or from abscess, etc., and my experience bears out the statement that Dr. Brubaker has made in his paper, that where the reflex disturbance is not great it appears to be a peripheral irritation. Where the irritation is slight, as in exostosed roots, the expression in the ear is chronic and fixed, and of a low degree of inflammation. I merely mention these cases as following out the thought of Dr. Brubaker.

Dr. C. S. Beck.—I am very glad to hear such a paper, and thankful that the gentleman is with us; and I would like to give the history of one or two interesting cases where there was some doubt as to the source of irritation. One was in a lady who had been wearing an upper denture for a number of years, and who was affected with twitching of the left eye. She consulted several physicians, and they went over the muscles and nerves of the face, and examined the uterus, to see if there was any trouble there. After a close investi-

gation they could not decide what caused this constant twitching. The eve was sometimes quite red and inflamed. She was in my office one day, and, in mentioning the subject, she said, "I am sure all my teeth are out, having worn a plate for five years. Still, I have an unpleasant feeling in my mouth sometimes, and cannot account for it." The gums looked a little red at one point, caused by the rubber plate. I inserted a delicate probe, and struck a hard substance like enamel. I said, "Are you sure you have had every tooth removed?" "Yes," she said, "I have them at home." I said, "There is something there, and this may be the exciting cause;" and suggested that she have her family physician come and administer an anæsthetic, and let me remove it. She was quite plucky, though, and said, "You can do it now." I made a crucial incision, and found a cuspid tooth lying horizontally across the jaw, which I removed with considerable difficulty. It seemed a cross between a supernumerary and normal tooth, and the little root had an exostosis upon it as large as a good-sized buckshot. I saw her the next day, and she said she was perfectly relieved. The inflammation had gone down, and the eye ceased to twitch. This had been going on for considerable time.

Now an amusing case. I had a young man in one Saturday evening who was suffering with a terrible pain in the first molar in the upper jaw. I examined it, and found it perfectly sound, but observed that there was a wisdom-tooth in the lower jaw in which the nerve was exposed. I tried to convince him that the sixth-year molar was not the seat of pain. He said, "I want that tooth out," referring to the first molar. I extracted it, and he was satisfied. Sunday morning he came up to the office and asked, "Is the man in who pulls teeth?" I extracted, at his demand, the second molar, and here were two teeth sacrificed. A little while later he returned and exclaimed, "My God, it has gone down here!" pointing to the wisdom-tooth. I removed this, and the pain ceased.

The final case I will mention is that of a lady who was enceinte, and whose physician feared there would be a premature birth. Her husband said she had suffered more or less from her teeth. She was brought to my office, and in going over her teeth on the lower left side I found a wisdom-tooth embedded, and the moment I touched it she started. Ether was administered, the tooth removed, and all the uterine pain ceased.

Dr. Dickie.—A case comes to my mind that occurred in London. A man of position and wealth, who had consulted the best medical skill possible, was afflicted with acute rheumatism of the hip-

joint, which had resisted all efforts for seven years. At one time attention was called to a fang in the inferior maxilla, which was troubling him, but not sufficiently marked to excite suspicion. That he might not suffer with the root in connection with the hip-joint trouble, a dentist was summoned, the fang removed, and the instant it left the jaw the hip-joint trouble ceased and never returned.

Dr. J. C. M. Hamilton.—A lady in our vicinity became violently insane for a year, the malady taking the form of religious mania of a very violent type. She was wearing an artificial lower denture, but her upper teeth were natural. She thought one day she must have a tooth pulled, and would have no peace until this was accomplished. She came into my office, and I saw it looked perfectly sound. I took hold of it, and, finding it slightly loose, I concluded it would be a good thing for the woman to remove it, and I undertook to extract it. I do not think I ever saw such a tooth to pull, and finally got an assistant to hold her head. It was exostosed so much that it was the size of a large hickory-nut, and the moment I took out the tooth she became rational, and has been so ever since.

Another case was that of a prominent gentleman in our place. In operating upon his teeth, several years ago, the pulp-canals were found to be ossified. He finally took a trip out to California, and while there was afflicted with a pain in the back of his head. He went twice to Philadelphia and once to New York for consultation, and returned home without having received any benefit, and then decided to consult a dentist. I told him the condition in which I found the pulps of the two teeth, and said the only remedy I knew of was to remove the teeth. This was done, some eight teeth being extracted, and he never had any pain afterwards. The pulp-canal of each tooth was ossified, and all in the same jaw.

Dr. W. E. Magill.—Another phase of the subject will be best illustrated by just saying a word or two regarding a case in our vicinity. The patient, a farmer, is afflicted with a periodic neuralgic pain, always in the facial region. It is an annual pain that comes on during the harvest season, and he is entirely relieved during the autumn and winter. He has exhausted the skill of the region around, and each new physician to whom he has gone has advised him to have some tooth extracted. One of the forms in which this attack comes on is in this way. He may be out driving when he is suddenly taken with a spasm, the reins falling from his hand. Whenever the attack comes on he decides to have a tooth extracted, and he

has for the time being temporary relief, which is generally accredited to the prescription of the new physician; but when the next season comes on he has the same trouble for the same period. The point I wish to make is this: if we are not competent to embrace the whole field in our diagnosis, we may do the very thing the physician does,—extract the tooth with no benefit to the man. He has lost several teeth in this way, is now nearly edentulous, and this summer has the same old trouble again. I see the point that the paper makes,—the necessity for a larger extension of our study, and for a better comprehension of the sympathies which exist between one part of the system and another.

Dr. J. C. Green.—I think we have gotten a better idea of the extensive influence of reflex dental irritation, and we are indebted to the doctor for his paper. In this connection I would simply say that when I was a boy, a few years ago, in my neighborhood there was an old lady, a relative of mine, whose jaws became locked. She went for treatment to the city of Wilmington, and the physician advised her to go to Philadelphia. She went to an eminent practitioner there, and he said, "Go to a dentist and have a tooth removed, and the jaws will open." Medical men, after all, have sometimes shown us a few things, and demonstrated that they know a few things, and we are very anxious to have medical men give us their experience, and are willing to respect their opinions once in a while.

Dr. W. H. Fundenberg.—Sometimes they know something and sometimes they do not. I had come to me two cases which physicians had treated for weeks and finally sent the patient to the dentist, and in both these cases, upon questioning closely, it was developed that the toothache was a neuralgic pain. They had not gone far enough.

I remember a case that occurred with my father. A patient came to him to have filled a left superior cuspid tooth, and on account of the small space for operating he decided to drive a wedge between, to separate the teeth. Immediately upon this the lady felt a sharp pain in the eye, resulting in an almost total blindness, which lasted for several days. It gradually grew better, her sight was restored, and the tooth was afterwards filled.

Dr. C. S. Beck.—One more case. A lady suffered two years with a disease that baffled her physicians. They said to the husband they could not detect the cause of the trouble, and that there was no hope of saving the lady's life; she might live for years, and perhaps not. The case was abandoned, and the lady made as com-

fortable as circumstances would admit. She thought she would like to have her teeth made more comfortable, and to this end they took her to a celebrated dentist, and he said, "Madam, your mouth is in a terrible condition; you are suffering very much from poison. The condition of the gums and tissues of the mouth indicate mercurial poisoning. Your health is poor, and I think if these fillings and some of these teeth were removed, your health would be much improved." This excited the husband very much, and consultation was had with the attending physician. The result was the removal of a certain number of bad amalgam fillings and also a certain number of teeth, and the lady's health was regained.

DISCUSSION ON PAPER BY DR. JAS. S. KING, OF PITTSBURG, ON "TREATMENT OF EXPOSED TOOTH-PULP."

At the conclusion of his paper, Dr. King said, "I would like to say that, in looking over the proceedings of last year, I find Dr. Kratzer said, according to the record, that I combined with creosote a small portion of oil of cloves. That I have never done."

Dr. C. V. Kratzer.—It was a mistake on my part, then.

Dr. G. W. Klump.—I am much obliged to the gentleman for his paper. I would like to ask him in what way he tells when the pulp is living or on the point of dissolution; in other words, how he prepares his cavity before he uses the capping, and does he entirely expose the pulp or leave a thin layer of dentine over it?

Dr. Jas. S. King.—As a rule, I leave in the bottom of the cavity some of the disintegrated dentine; but there are many cases that come under my treatment where actual exposure and perhaps continued pain have been present for a week, month, or possibly six months. I do not know whether I exactly understand your question as to the preparation of the cavity. I remove all the disintegrated tooth-structure that is possible. If strangulation has taken place there is no restorative treatment that we can offer. In some cases I may perhaps make an incorrect diagnosis, and put in a capping when it would be better not to make it.

Dr. G. W. Klump.—It seems an open question to me as to what is disintegrated dentine. I notice in your remarks that you say you remove all softened disintegrated dentine. There is a fine question in point. I think it is important in saving pulps to remove all the softened dentine; in other words, to find out the condition of the pulp. I think when pulps have been painful and have assumed a pathological condition, after a time they recede in

the pulp-chamber, and when you cap a pulp in that condition, with any part of the covering over it, you have a vacuum there, and if anything abhors a vacuum it is a pulp. It is better to expose it entirely and fill up the space. That is my experience, and I would like to hear from some others.

Dr. Jas. S. King.—Did I understand you to say that a pulp not entirely exposed becomes enlarged, swollen, and congested?

Dr. G. W. Klump.—No, there is a recession.

Dr. Jas. S. King.—Can it recede without exposure? I have been practising the method I described for a little over eighteen years, and I cannot recollect any cases where I have had trouble from recession of the pulp. I hesitate in no instance to cover the pulp if I imagine the course will justify it, whether the exposure be large or small, and rarely have I failures. It may seem a boast to say it, but it is nevertheless true. If there is a recession of the pulp, you will of course have a vacuum, but I have never had any experience that taught me that vacuums have given trouble.

Dr. Jesse C. Green.—I would like to ask Dr. King whether, after the application of the preparation to the pulp, it is followed by pain,—say one, two, or six months,—is the pulp alive after that?

Dr. Jas. S. King.—Followed by pain? Yes. In cases where the exposures are large there is a measure of uncertainty. If I make a mistake, and cover a pulp where actual strangulation has intervened, the life is cut off and there can be no restoration.

Dr. Jesse C. Green.—I meant to ask whether the pulp generally lived when treated as described.

Dr. Jas. S. King.—If the exposure has existed for a considerable time,—painful for months and years,—and even of large area, and I am sure that vitality is unimpaired to any great extent, I feel that I have no cause not to adopt my usual treatment. It is only in cases of doubtful vitality, and where there is a possibility of my judgment being in error, that I hesitate.

Dr. C. V. Kratzer.—Will Dr. King tell us what, kind of paper he uses?

Dr. Jas. S. King.—It is a thin and very stiff paper, manufactured in Pittsburg. Any paper that is free from dirt is good. The method of treating this paper in chloride of zinc is known only to the manufacturers. In my first experience I used a thin septum of vulcanite. This had some disadvantages, but was nevertheless successful. This chloride-of-zinc paper has been very successful in my hands, and I know of nothing to equal it.

Dr. C. V. Kratzer.—As to my statement published in the report of the last meeting, Dr. King was reported at that time by a member as using a preparation composed of equal parts of carbolic acid and oil of cloves, mixed with oxide of zinc, and I thought to correct it by giving what I understood to be his formula,—equal parts of oil of cloves and pure wood creosote, combined with oxide of zinc, with which I must say I have been reasonably successful. I have had some failures, but few. I have perhaps used finer discrimination than Dr. King has, for I have frequently given the pulp the benefit of the doubt and the devitalizing paste.

Dr. C. S. Beck.—I may not be right, but I think Dr. Jack was the originator of the treatment with creosote and oil of cloves in combination. While I was very much pleased with Dr. King's paper, I must take some issue with the gentleman. I do not think that the capping of pulps in all cases is such a success. I do not dispute Dr. King's success. I think we often overlook doubtful cases, because we think as the tooth is comfortable the pulp is intact. I must also differ with my friend, Dr. Klump. One point Dr. King made, and that was that if the decay was very shallow, and the pulp exposed, it indicates to us a large pulpchamber, and that he takes this preparation and places paper over the pulp-exposure, and then he introduces his hard filling. Now I cannot see how that hard filling can be introduced over an oily substance like creosote and oil of cloves, and be made a success; and even if a success, I should think it rather disastrous treatment, due to the fact that thermal changes would in time destroy the pulp.

The main success I have had in pulp-treatment has been in placing the pulp in as comfortable a position as possible, introducing a temporary material,—gutta-percha,—and letting that filling remain for a year or eighteen months; and after that, if I feel satisfied that I can fill that tooth with a hard material, I do so, but even then have some little doubt as to the success of the work. A pulp often takes a long time to die. I think a pulp uncovered and exposed to the secretions of the mouth will die rapidly. After an inflamed condition has been set up I do not see how it can be reduced,—how that engorged condition can be brought down. In my own experience I doubt whether there is as large a degree of success as is claimed. While they claim it in honesty, there are a great many failures they know nothing of.

Another point: Dr. Klump says he removes every portion of decay over an exposed pulp. I do not. I think it is good to re-

move all you can, leaving, if possible, a very thin stratum of devitalized dentine,—acting upon the theory advanced by many in our profession, that the lime-salts have been removed only from the semi-decalcified dentine, and that in time these salts will be reestablished. I think very often the best we can do is to leave this thin stratum, providing we can thoroughly disinfect it. You know that this devitalized matter is largely inhabited by microorganisms, and to get rid of these is the first step towards success. I really think that the old theory, however, when a pulp has been exposed any length of time,—to devitalize it, thoroughly disinfect the canal, and introduce in place of the pulp a good root-filling,—is about the best practice after all.

Dr. Wm. B. Miller.—I wish to coincide with Dr. Beck, for my experience is like his. While I wish to keep the pulp alive as long as possible, a great majority of us make a mistake in trying to keep alive those that ought to be destroyed. There is a difference between actual and partial exposures. Whenever a pulp has a thin layer of dentine covering it, it is not an exposure, and does not indicate a capping, but the placing of a material that will prevent thermal changes. Oftentimes we have patients come to us saying they have been suffering agony for some time, and that Dr. So-and-so capped the pulp. I have frequent experiences of that kind. Many pulps should be devitalized that are indiscriminately capped.

Dr. G. W. Klump.—My only object in entirely uncovering the pulp is to find out whether there is any secretion there. When a pulp has not given any trouble I do not pretend to expose it. I speak only of those pulps that have ached. If there is a large exposure, I think it would be folly to cap it without filling up the vacuum. You may find it dead, but they very rarely die without giving some trouble. I never expose a pulp unnecessarily; but when it has given trouble I am very careful to find out the condition it is in.

Dr. J. A. Mayer.—In my experience I would not hesitate to cap a pulp that had never ached or given trouble; but if it has been painful, and the exposure of long duration, I would not think of treating it in that manner until I first understood the conditions, and was sure the treatment offered a reasonable hope of success.

Dr. W. B. Miller.—I disagree with Dr. Beck in the use of guttapercha over the pulp.

Dr. C. S. Beek.—This is confined simply to pulps that have given no trouble. In excavating, if I find that the pulp is exposed, I re-

move as much of the dentine as I think I dare, and thoroughly disinfect the cavity. Two years ago I was very much censured by a gentleman because I said I used bichloride of mercury, one grain to the ounce, as a disinfectant. I have yet to see the slightest bad After preparing my cavity thorresults from such treatment. oughly, I leave as much of the dentine as I think I ought to: I then try to destroy the micro-organisms by disinfectants. After having done that I use any proper covering. I use a small cap of platinum filled with the following paste made of one part wood creosote, one part oil of cloves, a little oxide of zinc. The latter acts as a vehicle to hold my creosote and cloves. This treatment, I believe, Dr. Jack introduced, and I have used it for years. my paste thin, so it will flow nicely, fill that little cap full, and place it over the orifice. I wait ten, fifteen, or twenty minutes, until that becomes thoroughly set, and after that I remove all the superfluous margin, so that there is not a particle of this cement projecting from the cavity. In that cavity I place my gutta-percha filling.

Dr. Jas. S. King.—I thought in my paper I kept up the distinction between treating exposed pulps and those covered by a thin layer of dentine, as mentioned by Dr. Miller. Where there is a thin septum of dentine we are not treating an exposed pulp. It may be painful; but when it has been painful from acids, etc., it is not an exposure. When I spoke of exposed pulps, I meant it in the literal sense. I cannot conceive how Dr. Miller could remove the disintegrated dentine, and finally remove the last film, and not know that without pain he had a dead pulp.

Dr. W. B. Miller.—There are many cases, when we come to remove the entire covering from the pulp, that we find oozing out a small drop of pus, the suppuration only occurring at the point of exposure, and the lower two-thirds still alive. The fact of pus having formed is the reason why we have not pain. That portion is dead.

Subject passed.

(To be continued.)

NEW JERSEY STATE DENTAL SOCIETY .- (Continued.)

DISCUSSION ON DR. RUSSELL'S PAPER ON "COPPER AMALGAM."

Dr. Watkins.—In regard to the oxidation of copper amalgam, I saw a large filling the other day that was six months ago put in a molar tooth; the tooth was mostly built up with copper amalgam. The canals were filled, but for some reason the tooth ulcerated, and I had to extract it. In the extraction the crown was broken off; a small piece of enamel which came off was yellow; the lower part of the filling was as clear as any enamel filling could be, while the outer surface was as black as ink. I had supposed that the under sides of the filling would oxidize the most, and that the oxide of copper becoming embedded in the dentine would perhaps prevent the recurrence of decay; but the condition of things in that filling was exactly opposite to what we would expect on that theory.

With respect to copper amalgam setting quickly, Dr. Russell stated that he was accustomed to squeeze out the excess of mercury with pliers. I never had very good success in that way with any amalgam. I do not like to squeeze amalgam. The best success I have had has been in taking care not to overheat the amalgam. I think the mistake is often made of heating it too much and evaporating too much of the mercury; then they have to add mercury, and, getting too much, must squeeze the excess out; and the result is a bad filling. If the amalgam is heated to the right consistency, then ground vigorously and rapidly in a wedgewood mortar, it will work very nicely. If it should require more heating, heat it a little, not sufficient to bring out globules of mercury on the surface, and grind it again. I have never seen any copper amalgam so dry that I could not work it. Two weeks ago, in Boston, I gave a clinic, and the Boston men were much interested, and asked a great many questions. They were surprised to see me work so hard in grinding the amalgam. They asked me to show them how to mix copper amalgam, and I did so. Dr. Fillebrown said he believed he could now use copper amalgam successfully. It is hard to get men into the way of grinding amalgam with vigor and a vengeance; and it must be so ground in order to get the best results.

I do not think there is any shrinkage whatever in copper amalgam, nor any swelling, and no chipping unless you leave too much of a feather edge.

Dr. E. Parmly Brown.—I cannot keep quiet when these questions are up. Looking back over the history of amalgam forty or fifty years, I remember how our fathers, and the fathers of American dentistry,—Dr. Leslie and Dr. Parmly and others,—argued against the use of amalgam because it was poisonous. It is poisonous, but I am using it right along. It kills bacteria. Bacteria do not develop worth a cent around a black amalgam filling. But if you want to make sure of it, use a weak solution of bichloride of mercury.

Dr. Foote.—I have had but very little experience in the use of copper amalgam, but I want to get the experience of those who have used it, in contradistinction to what is known as copper alloy. I have had some experience with copper alloy, ground and mixed with mercury. The instructions are to mix it soft and wafer it up. Quite a number of fillings put in in that way have come back in a softened condition months afterwards; so soft that they have been scooped out by the brush in cleaning the teeth, although I left them quite hard when wafering them up.

Dr. Edmunds.—I suppose copper alloy and copper amalgam are so separate and distinct that it is hard to draw a comparison between them. I do not understand how the gentleman's alloy fillings could be scooped out. They must have contained a large amount of copper, which would make a very soft filling.

Dr. E. Parmly Brown.—It strikes me now that we can look ahead in this copper amalgam business. Who can say that copper amalgam, with its antiseptic qualities in the mouth, is not going to prevent a thousand contagious diseases that may approach us, by killing the bacteria? Who can say that a thousand lives may not be saved by the slight antiseptic qualities carried in the copper amalgam fillings that we put in?

Dr. Sanger.—I was struck with one thing in the paper,—that is, that, contrary to general usage, the essayist did not claim copper amalgam to be good for everything. He admitted it was good in certain cases only, as I have found it in my experience. I simply rise to corroborate what he has said, and to tell my failures, the cause of which he has explained. In the use of copper amalgam I meet, every once in a while, with a very disastrous failure. At first I attributed them to my ignorance of the proper way to manipulate it. I noticed that the failures were bright fillings which had pleased me greatly when I looked at them a week or two after they were put in, their color was so good; but in a little while I found that my beautiful fillings were disappearing, and the

edges showed signs of leakage. I believe Dr. Russell has explained clearly the cause of it. I found it invariably the case that where there was a strong acid reaction in the mouth my fillings failed; and when that condition did not obtain, my copper amalgam fillings were successful, and successful where other amalgam fillings failed.

Dr. Gilson.—Mr. President, I have noticed, in the use of copper amalgam, that the temperature of the weather when you mix it makes a difference in its working qualities. If you mix it on a cold day and in a cold mortar, you do not get the same result that is found when the mortar is slightly warmed. The temperature of the mortar should be about the same as that of the amalgam when we take it from the spoon. When the mortar is warmed you need not heat the amalgam quite as warm as would otherwise be necessary. Working it in the hand also tends to keep it warm, by friction and the heat of the hand.

Dr. William H. Trueman.—I have had some years of experience with copper amalgam, and have used a good deal of it. I admired one word that Dr. Russell used in his essay,—that is, the word discretion. I think copper amalgam should be used with a great deal of discretion. It is certainly a very valuable addition to our tooth-saving materials, but unless it is used with caution it probably will do about as much harm as good.

In order to get a fine precipitate of copper I found it necessary to have a solution of sulphate of copper, a very dilute solution. After obtaining the precipitate I wash it a number of times in a weak solution of boiling hydrochloric acid, till the acid no longer shows a chemical trace of iron. It is astonishing how long that washing has to be continued. Then it is put in a mortar and mercury is added. It is usually necessary to add a little hydrochloric acid, or sulphuric acid. Then the real work begins. It is remarkable how much black something can be washed out of a batch of copper amalgam before it can be called clean. It has usually taken me about two evenings, of about five or six hours each, to wash a batch of copper amalgam, using hot water, and changing the water an indefinite number of times. It is an exceedingly tedious process, but when the amalgam is clean it pays for all the labor expended upon it. Not only is it made very clean by this washing, but the constant trituration seems to improve its qualities very much. I find it better to keep quite an excess of mercury during this process. After it is completed the excess of mercury is pressed out through a chamois skin; then it is ground up again, and the surplus mercury again pressed out and removed. By this

means you get the copper almost back in its original condition as a precipitate. I think it is best to leave the excess of mercury in the amalgam till you are about to use it.

When you first use copper amalgam you fall in love with it. It has certain qualities that are very pleasant. In the first place, it does not shrink. It can be used very soft, and then it becomes very hard. I think the reason it will remain in cavities and preserve teeth where nothing else will is because of its hardness, and this hardness does not depend very much upon the quantity of mercury in it. If you use a common amalgam, or amalgam alloy with an excess of mercury, it never becomes hard, and you have retaining grooves filled with an amalgam that has less hardness than the body of the filling. But as the hardness of copper amalgam does not depend so much upon the quantity of mercury it contains, the fillings made of it are retained in place more perfectly than alloy amalgam fillings would be.

The time was when I said I had not seen a case where copper amalgam had discolored the teeth. I cannot say that now. It is remarkable how long a tooth will retain its color, while the amalgam on the exposed surface becomes black; but after a time there is a staining of the tooth. It may be that the color in the amalgam shows through, but I am inclined to think that the tooth will in the end be permanently discolored.

It is a very nice thing theoretically to fill one portion of a cavity with copper amalgam and then upon that place gold. I have done that in some cases, and have found the teeth turning a very dirty green, which was very objectionable. You will use copper amalgam perhaps three or four years before you discover these things.

In regard to using an alloy with copper amalgam, I have never found alloy and amalgam to harden. In every case it has remained soft and granular.

There is another point in connection with its use with other metals. The nickel screws which are used to set crowns are sometimes entirely destroyed by contact with copper amalgam. After the lapse of twelve months or two years I have found the spaces that the nickel screws should have occupied entirely vacant.

I think Dr. Russell has done us a great service in advocating the use of copper amalgam with discretion. I use it, and expect to continue to use it. I think it will save teeth when nothing else will, but it should be used with a great deal of discretion.

Subject passed.

DISCUSSION ON DR. EDMUNDS'S PAPER ON "REMOVABLE BRIDGE-WORK."

Dr. E. Parmly Brown.-Mr. President, ladies, and gentlemen: When I promised to reply to Dr. Edmunds's paper I had no data to guide me in my remarks, until I received the American Journal of Dental Science, which had a paper by Dr. Edmunds on crown and bridge-work, copied from the Student's Record. While reading that paper I noted down a few points, thinking that the doctor would probably put some of the most salient in this paper. I afterwards received from him what he called a synopsis of his paper, but from it I could get very little to go by. I find, to my chagrin and discomfiture, that he has not put any of the points of that paper into his paper of to-day. His paper is all right; I cannot take any exceptions to it. I have not tried rubber nor celluloid for bridges. Rubber is good for certain purposes. A removaable bridge, one that may be removed, but does not move when it is not wanted to be removed, would be a grand thing. The majority of the bridges made to-day are removable long before you wish them to be. As they told me over in England, most of them were "'anging haround hon one 'inge" in a few weeks. But that is not saying that bridge-work is no good in itself. If one of your fillings should happen to come out, you would not say, "I will never insert another filling; fillings are no good." Here is a gentleman at the door (Calvin) who is in danger from implantation. I told him that although freedom took him off the plantation as a slave, yet he has to go back on a plantation because he has one in his mouth, and the first thing he knows he will be a slave again. The question will come up, Who is he? When Webster killed Parkman in Boston, they discovered the murdered man by his teeth found in the furnace. Now, suppose the person from whose mouth that tooth of Calvin's was taken should be murdered, and her teeth should be discovered in his mouth; why the jury would find that that young lady had been murdered by our friend from Central Africa. If we are going on in this way to wear somebody else's teeth, I should like to know who we shall be in the course of time. Dr. Edmunds said that bridge-work made of rubber and celluloid could not be detected on the most careful examination.

Dr. Edmunds.—No; I said observation.

Dr. Brown.—Observation; at a distance—

Dr. Edmunds.—While speaking to the person.

Dr. Brown.—I have been mussing with teeth for nearly forty years, since I was six years old, and I have never yet seen an ar-

tificial tooth that was backed up with a material like gold, rubber, or any material of that kind, that was not translucent or transparent, and that had at a long range a natural appearance, let alone close observation such as you get in conversation.

Dr. Pinney.—If Dr. Edmunds would show us some samples of his work, which he speaks of, we should be able better to understand his ideas and to discuss his paper more intelligently.

Dr. Edmunds.—I have here only the casts on which some of the work was done; I have not a sample of the work.

Dr. Watkins.—I am informed that the teeth which were used to retain the plate in the case described were loose, from the effects of salivary calculus, before the doctor began to treat them; he treated them, and new granulations were thrown out and the teeth have become firm, and on those two roots he placed the bridgework. He had more courage than I should have had under the circumstances.

Dr. Edmunds.—They were nearly firm when I capped them. They are now as firm as they were when the bridge was inserted. The piece was put in a year ago last June.

Dr. Brown.—That is a point in the paper which I want to speak of,-inserting bridges upon teeth that are loose. A good way to keep such teeth loose and prevent the parts from healing up would be to allow them to stand without support. The way to give nature a chance to heal them up and make them firm is to put them as soon as possible in the condition they were in when God implanted them there; to allow them to be supported in the dental arch; and the quicker you can get those roots bridged or crowned, no matter if there are running abscesses around them, the quicker they will heal. Three days ago a lady came to me with an abscess; she had had an artificial crown inserted to hold a bridge, and the pin of the crown had been allowed to run up about half the length of the canal. Nature gave us a long canal to support crowns, and when the dentist in fastening a bridge or crown cuts off the pin and puts it in but half the length of the canal, he fixes up a very nice arrangement for splitting the root. Put the pin in as far as the canal will permit, and you get strength, and the root will not split half so easy as it will if the pin goes up but half the distance. I lanced that abscess and cauterized the opening. I said, that is a safety-valve. Then I inserted a crown, running the pin entirely to the apex of the root. The next day there was no external sign of inflammation at the root.

With regard to sustaining a loose tooth with a bridge: if you

have other healthy piers to support it, you are saving that individual root from being attacked alone by its enemy. The things which move it prevent nature from healing it. In union there is strength. We ligate loose teeth for the purpose of giving nature a chance to heal them. Remove the irritating cause, keep them firmly in position, and they will heal nicely.

I have in mind two cases where I inserted porcelain dentures. In one case there was a single canine root. It was very sore. I knew it would get well quicker if we could hold it in position than if we were to apply powerful medicines. The work was done at once, and the tooth got well immediately. I saw the case a few days ago, and the root is perfectly healthy.

Dr. Stockton.—Mr. President, I am sorry that Dr. Brown has not spoken more particularly upon the principal point of the paper, which I take to be the advantage of a removable bridge over a fixed one. That is what I wanted to hear Dr. Brown discuss. So far as I am personally concerned, I may say that I have seen a great many cases of fixed bridges, and my impression is that they are a nuisance to the patients and to those that come in contact with them, and that they sooner or later cause loss of the teeth to which they are attached. If bridges can be made removable, it seems to me that that would be a great deal better way of putting them on. The only question in my mind is whether the constant taking out of the bridge for cleansing purposes would not cause loosening of the capped teeth. I have not seen removable bridges in use long enough to determine that question. But I am satisfied that bridges that are so fastened that they cannot be removed from the mouth by the patient are not a good thing; and if we must wear an artificial substitute of some kind I would much prefer a good gold plate to a fixed bridge that could not be taken out and cleansed. Our mouths are dirty enough anyhow, the best of us; the mouths that come to us are oftentimes anything but sweet and pleasant; and if we place in them an artificial denture that cannot be removed and cleansed, it will surely prove to be a nuisance. It is on this point especially that I wanted to know Dr. Brown's opinion.

Dr. Edmunds.—Dr. Stockton has confined himself closely to the point that I wished to make in my paper. After wearing a fixed bridge in my mouth for five years, I found that, although there were only a few teeth attached, it was almost impossible to keep the piece as clean as I should like. It occurred to me to make a removable bridge; and after several experiments I made one which

was held perfectly in place, without rubbing the teeth that it was attached to.

When I spoke of making the capped tooth conical from the margin of the gum, I did not mean that I made it completely so; it is rather flattened on the anterior and posterior surfaces, which prevents the bridge from being twisted around in the mouth. There is no additional strain upon the teeth that support the bridge, because the bridge rests upon the gum, and the force of the other jaw comes upon the gum.

Dr. Brown.—I did say something about removable bridges. I said I did not know what Dr. Edmunds's bridge was. I will now say that if a removable bridge is adopted by the dental profession in preference to an immovable one,—if we are not equal to the occasion and want to bridge an intervening space,—they are the best thing. By having a removable bridge we save ourselves work; we can make a lady's teeth so she can take them out and give them to the bootblack to be cleansed, and then stick them in again. Removable bridges are good; that is not saving that immovable bridges are not better. When we began to adopt bridgework I looked into it, and I saw it was difficult; I knew that the common herd would never go ahead and lead, but would be content to walk the beaten path. It takes a man to discover America, or to go through the wilds of Central Africa; it takes a man that will not be rebuffed by the first savage tribe or tiger he sees. It takes a man of nerve to make any advance in dental practice that is worth anything; it takes a man that will not be discouraged by one or two failures, but will look farther and discover whether those failures can be avoided, and consider whether the percentage of failures is in accordance with the percentage of successes that will bless mankind.

Dr. Pinney.—I have been unfortunate enough to lose a tooth or two, making it necessary to bridge over that space. At one time I had what I thought was the very finest thing out, a removable bridge, but it soon started the tooth to which it was attached, and wiggled it out. It was the work of one of the very best workmen perhaps in the country. After that I had a permanent bridge made, and it is one of the most beautiful things I have ever seen. It is a great deal more cleanly than the other was. I could not keep the removable bridge clean, and it would shift about and bother me all the time. I was happy when the tooth came out and I could throw the thing away. The permanent bridge is a great satisfaction to me. I do not think I have ever seen a removable bridge

that was worth anything. You cannot keep it tight. It wiggles a great deal, and finally the tooth comes out, or something is wrong about it. The permanent bridge stays in place without any trouble.

Dr. Truax.—This subject of bridge-work is like the old one of filling teeth. Some will use nothing but gold, and others tell us nothing but amalgam should be used; some prefer gutta-percha, and others like a combination. After all, the question reduces itself to the filling of teeth with judgment in each individual case. The removable bridge has its advantages. The advantage of the removable bridge is that it can be taken out and cleansed. I think we should learn to discriminate between them, and to use the right one in the right place, making our work an individual operation in each case, which will insure higher results and the greatest good to patients.

Dr. Edmunds.—In reply to Dr. Pinney, I shall be happy, at some future time, at some meeting of the District Society of New Jersey, or at your annual meeting, if you will send me a notice, to produce at the clinic or society meeting a patient for whom I have inserted one of these bridges, and I think an examination of the work will convince every one that a removable bridge, of any dimensions, can be kept perfectly clean, and will not wiggle about in the mouth as Dr. Pinney describes. It can be kept cleaner and better than immovable bridge-work.

Dr. Stockton.—This is a very interesting question, the comparative merits of removable and immovable bridges. We have with us Dr. Waters, who presented to the profession a removable bridge; he has had very large experience undoubtedly, and I think you would all be very glad to hear him on this question.

Dr. Waters.—Mr. President, my experience has been that removable bridge-work is in my hands much preferable to fixed bridge-work; it has been more satisfactory to my patients and to myself. I have constructed both kinds in the mouths of patients whom I knew to be cleanly, and my experience has led me to make removable bridges wherever it is practicable. We cannot make a practical piece of removable bridge-work in all cases, nor can we make a thoroughly practical piece of fixed bridge-work in all cases. We must exercise our judgment as to which is adapted to the particular case in hand. I have had several pieces of removable bridge-work in the mouth for some years. Dr. Brown has seen one piece after it was worn a considerable time. I received a letter in June from a young man who had been wearing for two years a removable bridge which I made for him, saying he had had the misfortune to have

it broken. While he was cleaning the piece a young man, seeing some disturbance on the street, ran by and knocked it out of his hand and put his foot upon it, and disfigured it very much. He was much distressed, as he was anxious to go to the Georgia State dental meeting and wanted to exhibit that piece of work. He sent me the wreck, together with an expression, model, and articulation. In about a week from the time he sent it to me he again had the piece in his mouth, and he wrote me that it was as satisfactory as the former piece. I made it without seeing the patient. A strong point in favor of removable bridge-work is that a patient at a distance can send an impression and model to you and have a new piece made without having to visit you personally; and in case of any accident to the teeth by which it is supported the piece can be removed and the teeth treated. With fixed bridge-work, in case of any accident, the entire piece must be removed, which requires considerable time and work. One of the patients I spoke of as being very cleanly had the misfortune to break a piece of fixed bridge-work in trying to remove it. I afterwards put in his mouth a piece of removable bridge-work, since which I have had no trouble with it, nor has he.

One feature of Dr. Brown's method is much in its favor; that is the porcelain. I have found that where gold is exposed in the mouth it is very difficult to keep it clean, but with porcelain there is not much difficulty. I have not seen any of his cases,

I do not know that I can say anything more, except that in my hands removable bridge-work, constructed with judgment, is preferable to fixed bridge-work. Removable bridge-work is certainly an improvement over the old clasp method.

In the case that I spoke of, the young man wears a molar, cuspid, and bicuspid, supported by a molar and bicuspid, and those teeth are as firm now as they were when they were capped. He wrote me that after the bridge had been off for about a week the supporting teeth got a little tender, but after the piece was put back in place they felt all right. Whether taking a bridge out two or three times a day to cleanse it would tend to loosen a supporting tooth in course of time remains to be seen. I have one case that has been worn for three years, and the teeth are in perfect condition and the whole work very satisfactory.

Dr. Pinney.—I would like to ask Dr. Waters and Dr. Edmunds how long it will take the saliva or the acids of the mouth to become putrid around those caps. It takes but a very short time; and I have yet to remove a bridge or cap, or anything of that

kind that had been worn a few hours, that was not very offensive. You cannot make the caps so tight as to exclude the fluids of the mouth, and in an hour or two they are rancid. I think the case of Dr. Waters, which was sent a long distance to be repaired, is not a very great triumph over fixed bridge-work. If he had not had his teeth out of his mouth, no person could have put his foot on them and they would not have been broken.

Dr. Edmunds.—The caps can be made absolutely air-tight, and the saliva will not accumulate under the cap over which it is telescoped, if made in the way I have suggested.

Dr. Rhein.—I suppose the best of us are too frequently wont to go ahead and do operations too quickly, without judging the best method to be followed in each case. And we are, of course, somewhat excusable in so doing, because our time is valuable, and because a great many of our patients are hardly willing to pay for time taken in reflection; but that is where most of the errors are made in doing anything that is not a simple operation. We do not take into consideration whether this thing would be better than that, or some other operation better than either of them. If we were to do that, we should generally reach a conclusion that would not afterwards be found to be a failure.

The point I wanted to raise in this matter was the question of the possibility of keeping fixed bridges in a cleanly condition. I have seen a number of fixed bridges that were in a very filthy condition; yet I have seen a number of them in as cleanly a condition as most patients keep their natural teeth; and the impression I have gained has been that in every case where the operator has endeavored to make a cleansing space under the fixed bridge he has made a place for the accumulation of filth and débris, sooner or later. Even where a decided cleansing space has been left, the soft tissues will, in course of time, close up that space just sufficiently to make it exactly the opposite of what it was intended to be. I believe the only successful cases of fixed bridge-work that I have seen have been those in which the bridge impinged so tightly upon the soft tissues as literally to embed itself in them. That is the method that I have always used.

Dr. Waters has expressed the opinion that porcelain is much more cleanly than gold, and I think he is quite correct in that. He, however, thought the gold fastening of porcelain bridges to the natural teeth was an objection. It is no more a bar against porcelain bridge-work, if it is perfectly adapted to the tissues and embedded in the gum, than an artificial gold filling in a natural

tooth. If a filling is made in such a way as simply to contour the space between the natural teeth and the bridge, leaving a space in some cases, perhaps that would be self-cleansing; in other cases there would be no space at all.

Dr. E. Parmly Brown.—It is a very healthy sign, gentlemen, to see you sit here so long listening to that awful subject of bridgework. Only one gentleman has said nothing whatever against bridge-work, and that is Dr. Stockton, and I will venture to say that he has never put in one. Every man who has adopted bridgework, and who has done it successfully, backs it up, so far as I know.

Dr. Waters presented, I was going to say, some splendid arguments in favor of removable bridge-work. It is a splendid piece of work; better than any plate, or anything else except a piece of good porcelain bridge-work, permanently fixed, and resting so firmly on the gum as to smother bacteria to death. That is what you really want, and what will do you good.

Dr. Stockton.-Mr. President, the remark of Dr. Brown, that the only gentleman who has not raised his voice against bridge-work was Dr. Stockton, and that he probably had never used it, is in accord with many of his statements,-they are to be taken with a very large dose of salt. I have put in a great many pieces of bridge-work, and I did not raise my voice against bridge-work, nor do I. The only question I raised was, Which is the better of the two methods? Bridge-work is used, and will be used for all time to come, and what we want to know is which is the better plan of putting it in. It has been said that by keeping loose teeth in a rigid position they were likely to become firm and good, and it is true that tying a loose tooth to a firm one is the best way to get it firm. But the question arises whether the frequent removal of these bridges, which are made so tight-fitting that the saliva cannot get under the fastenings, will tend to loosen the teeth to which they are anchored. That is the point on which I should like to have Dr. Edmunds's opinion.

Dr. Edmunds.—The case that I spoke of in my paper seems to be a sufficient refutation of the notion that the removal of the bridges for cleansing purposes will loosen the supporting teeth. In that case the teeth were loose when I put the bridge in; they were in bad condition; and to-day, after the bridge-piece has been worn about three months, they are more firm than they were the day I inserted it.

Dr. Carroll.-I did not hear the paper. I rise merely to rein-

force some remarks made by Drs. Rhein and Brown, with regard to the relative value of fixed and removable bridge-work. While I am a practitioner of the old school, and somewhat fixed in methods of work, I agree with Dr. Rhein as to thorough eclecticism in the use of bridge-work. The man who undertakes to pursue one form of bridge-work in all cases will have failures. I have adopted a special form of fixed bridge, made by capping the abutment roots or teeth, and then telescoping over them, resting the bridge not only upon the abutments, but firmly upon the gum as well. Theoretically that is not a good form of bridge-work. Practically it is the form of bridge-work, to my mind, to-day, and the only form that is going to stand in all cases. Theoretically it is not a good form, for it is a saddle or plate resting upon the gums, and therefore might become foul, I adopted that form very reluctantly. During the past eighteen months I have put some thirty or forty different pieces of this kind in my patients' mouths, watching them very closely. The last case I observed was yesterday in my office, one of the most cleanly patients I have ever had in my practice. He had nothing back of the cuspid, but had the teeth in front of the cuspid. I saddled the lateral and the cuspid on one side, and the cuspid and bicuspid on the other side,—the most unfavorable form for a fixed bridge. They were aluminium bridges. When cemented in place upon the teeth they rested firmly upon the gums, and having a good occlusion below, he had excellent use of it as a mill with which to grind. I have seen the patient a number of times since it was inserted, and he says there is no uncleanliness whatever. In my own mouth I have a fixed bridge of the kind indicated, and I have a constant sense that it is not a cleanly piece of work. It was made by one of the best workers in America. On the other side I have a removable bridge, which I can keep pretty clean by removing and cleaning it. The result of my observation in over fifty cases of bridge-work is that the fixed form is the best when resting not upon the teeth alone, but upon the alveolus as well.

On motion of Dr. Watkins, the subject was passed.

Editorial.

REPLY TO THE COSMOS ON TRADE JOURNALISM.

THE undignified and personal editorial in the October Cosmos gave us as much surprise as regret, for the question had been discussed in the article on Trade Journalism from an entirely impersonal point of view, and the course of the Cosmos for the past few years was cited simply to strengthen our position. If the comparison had been favorable to that journal, nothing further would, probably, have been heard from it; but because it was not, the editor saw fit to reply in a manner at once discourteous and unreasonable.

The course of a journal is open for inspection, comment, and criticism, if the general good seems to require it. We deprecate personal controversies, and do not propose, in meeting ordinary questions, to enter into that kind of argument; nevertheless, we felt called upon to notice the evident dereliction of duty upon the part of the *Cosmos*, and would respectfully remind the editor that, in discussing any question pertaining to the good of the profession, we are strictly attending to our legitimate duties.

The International Dental Journal represents a medium of expression which is entirely untrammelled by collateral business interest, and therefore represents a condition of independence that a trade journal necessarily cannot assume. This point was virtually admitted by the Cosmos in that no attempt was made to answer this argument. It exhibited a want of interest in the profession when the editor remarked, "The Dental Cosmos is not the organ of the Dental Protective Association, nor is it the organ of any society or association." That was precisely what we claimed; and if the paragraph had gone farther and said that it is, however, very watchful of the interests of its company publisher, and is essentially its organ, then the whole ground would have been covered, and we would not have been put to the trouble of further pursuing the subject.

Not only was the editorial undignified in character, but it was also unfair when it tried, by misrepresentation, to undervalue the service this journal has rendered the Dental Protective Association. It says:

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"What will be thought of the fact that the only two circulars authorized by the directors of the association, of which we have knowledge, have never appeared in the reading-pages of the *International Journal*, although they each had two insertions in its advertising columns?"

Now, the fact is that the circulars referred to were inserted in our advertising columns with the full knowledge and consent of Dr. Crouse, for the reason that it was proposed to keep them as standing matter; this we did, and at the same time published much information regarding the association in our editorial and reading columns.

Again we quote, italies ours:

"It [the Cosmos] has given its readers all the information needed concerning the Dental Protective Association, and the editorial on that subject, as it appears in the current number, was in type before the issue of the journal whose uncalled-for remarks we have quoted."

From which it appears that the editor of the Cosmos constitutes himself the judge as to how much information is proper for the profession to receive on such matters. This is not the first time, that he has asserted a judicial prerogative on questions of general interest. The rebuke to the members of the Odontological Society of New York is still fresh in the memory of those gentlemen, and a reference to it here may not be out of place. The article may be found in the June number of the current year. In substance, it says that Dr. Merriam, in order to have kept within the lines of propriety, should have confined himself to a discussion of the relations of dentists to one another. The assumption of the position of censor of what the profession may or may not discuss is in line with the recent attack on this journal. Who, may we ask, constituted the editor of the Cosmos the censor of the profession? What was said at the meeting of the New York Odontological Society was the merest ripple upon the deep-running stream of opposition to such presumption, and the sharp manner in which the Cosmos tried to quell the uprising has not tended to quiet matters.

In conclusion, we desire to say that the position of this journal is one of entire independence, and our business the interest of the profession. We therefore insist on the right, not only for ourselves, but of each and every worker in the profession, to free expression on all matters relating to general interests, whether it be the relation of dentists to one another or to the dealer or manufacturer who furnishes our supplies, and consider him an autocrat indeed who attempts to abridge our right to free speech, by pronouncing impersonal criticism impertinent intermeddling.

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THE ODONTOLOGICAL SOCIETY OF PENNSYLVANIA

THE attendance at the first two fall meetings has been large. and everything points to an active year's work. The committee appointed to consider the plan for the formation of a literary and scientific club have reported progress, but asked for another month to perfect their arrangements. The executive committee reported a plan for an additional course of lectures to be held under the auspices of the society, but to be given on evenings other than those of the regular society meeting. The first of these was given Saturday evening, November 2, by Professor Ernest Laplace, of Philadelphia, on the subject of "Fermentation: its Cause and Effects," and was listened to with much interest, as explaining the cause of decay and perhaps other oral diseases. Professor Laplace is widely known as the discoverer of the value of acid-sublimate in antiseptic surgery. He is thoroughly posted in microbiology, having spent several years abroad in the laboratories of Pasteur, the discoverer of fermentation, and Koch, of later but not less fame. The lecturer succeeded in simplifying the subject so as to bring it within the comprehension of all. The doctor has been invited to give another lecture, which will consist of a practical demonstration of the different ferments, with a description of the process of their cultivation, and the apparatus employed. For the latter the beautiful and complete apparatus which has just been ordered by the society from Germany for their new scientific club-rooms will be used.

Professor Harrison Allen, of Philadelphia, will deliver a lecture in the course on the catarrhal nature of oral affections, under the title of "Clinical Signs in Common to Nose, Throat, and Mouth." Professor Allen's extensive experience as a specialist in the treatment of affections of the nose, throat, and oral cavity, especially fits him for handling the subject assigned him.

Professor E. D. Cope, of Philadelphia, will give a lecture upon "The Evolution of the Mammalian Dentition." His wide reputation as a comparative anatomist and paleontologist is a sufficient guarantee that the subject will be treated in a masterly manner.

The course will be closed by Professor Sudduth, with a lecture on "The Morphology of the Micro-Organisms found in the Mouth," using the stereopticon to throw the photo-micrographs on the screen. The lectures will be free, and all are invited to attend.

We congratulate the readers of the International upon the action of the society, for the papers will belong to the Journal for publication.

BIBLIOGRAPHY.

Annual of the Universal Medical Sciences: A Yearly Report of the Progress of the General Sanitary Sciences throughout the World. Edited by Charles E. Sajous, M.D., and Seventy Associate Editors, assisted by over two hundred Correspondents and Collaborators. Five vols., 8vo. Numerous Chromo-Lithographic Illustrations, Engravings, and Maps. 1889. \$15 per annum. F. A. Davis, Publisher, Philadelphia, New York, and London.

The second edition of this valuable work has been delivered, and met with universal favor at the hands of the profession. Many improvements were made in the arrangement of the text and the mechanical execution of the work. To each reference has been added the date, number, or volume of the journal quoted. Foreign weights and measures have been reduced for the benefit of those who do not understand them; a complete and compact index has been added to each volume. The annual stands to-day without a peer as a reference hand-book of the latest advances made in every department of scientific research, and should be in the library of every dentist who has any aspirations to possess a library and do any reading outside of his own specialty. Short, comprehensive reviews of the best articles printed in all languages are therein found. We are sorry to say that the section on dentistry has been discontinued. but it was found impracticable to carry it on, as not enough dentists showed an inclination to encourage its continuation.

Human Physiology. By Landois and Stirling. With 692 Illustrations. Third American, from the Sixth German Edition. A Text-Book of Human Physiology, including Histology and Microscopical Anatomy, with special reference to the requirements of Practical Medicine. By Dr. L. Landois, Professor of Physiology and Director of the Physiological Institute, University of Greifswald. Translated from the Fifth German Edition, with additions by Wm. Stirling, M.D., Sc.D., Brackenburg, Professor of Physiology and Histology in Owen's College and Victoria University, Manchester; Examiner in the Honors' School of Science, University of Oxford, England. Second Edition, revised and enlarged. 692 Illustrations. "A bridge between Physiology and Practical Medicine." One Volume. Royal Octavo. Cloth, \$6.50; leather, \$7.50.

" From the Prefaces to the English Edition .- 'The fact that Professor Landois's book has passed through four large editions in the original since 1880, and that in barely six months' time a second edition of the English has been called for, shows that in some special way it has met a want. The characteristic which has thus commended the work will be found mainly to lie in its eminent practicability; and it is this consideration which has induced me to undertake the task of putting it into English. Landois's work, in fact, forms a Bridge between Physiology and the Practice of Medicine. It never loses sight of the fact that the student of to-day is the practising physician of to-morrow. In the same way, the work offers to the busy physician in practice a ready means of refreshing his memory on the theoretical aspects of medicine. He can pass backward from the examination of pathological phenomena to the normal processes, and, in the study of these, find new indications and new lights for the appreciation and treatment of the cases under consideration. With this object in view, all the methods of investigation which may, to advantage, be used by the practitioner are carefully and fully described. Many additions, and about one hundred illustrations, have been introduced into this second English edition, and the whole work carefully revised."

After a careful perusal, we can fully recommend Professor Landois's physiology to students as a standard work on the subject. It is especially noticeable for the practical every-day manner in which all subjects are treated. Its conciseness is a marvel when its completeness is taken into consideration.

WE are in receipt of two more copies of the popular "PHYSICIANS' LEISURE LIBRARY" series. Published by Geo. S. Davis, Detroit, Michigan. Single copies, 25 cts. each.

The first relates to the treatment of the morphia habit, by Albrecht Erlenmeyer, and translated by E. P. Hurd, M.D. It is a practical treatise, giving methods of treatment, citing cases, and is of particular interest to physicians only; but the other volume, on *Dyspepsia*, by Frank Woodbury, M.D., is of special interest to dentists; for who in our profession are not more or less subject to this malady. Dr. Woodbury handles the subject in a clear and concise manner, taking up the cause, symptoms, and treatment.

ORTHODONTIA; OR, THE MALPOSITION OF THE HUMAN TEETH: ITS PREVENTION AND REMEDY. By S. H. GUILFORD, A.M., D.D.S., Ph.D., Professor of Operative and Prosthetic Dentistry in the Philadelphia Dental College; Author of "Nitrous Oxide," etc. Press of Spangler & Davis, Philadelphia; and for sale by the S. S. White Dental Manufacturing Co.

The finished work was submitted to the National Association of Dental Faculties at its last meeting. The first fifty-five pages are devoted to the principles involved in the art. Part II., fifty-one pages, considers materials and methods; and Part III. takes up specific forms of irregularities and their treatment. The book is well gotten up, is amply illustrated, and presents a very creditable appearance.

It comes nearer being the ideal text-book than any that have yet been presented to the association for their approval. In it a student may find principles discussed to a sufficient extent to enable him to understand the methods employed, and the ample illustrations used make their application easy to understand. It should be in the hands of every student.

AIDE-MÉMOIRE DU CHIRURGIEN-DENTISTE. Par M. PAUL DUBOIS. Directeur de l'Odontologie; Président de la Société d'Odontologie de Paris; Professeur Suppléant de Thérapeutique spéciale à l'École Dentaire de Paris. Deuxième Édition. Première Partie, Thérapeutique de la Carie Dentaire. Livre deuxième. Dentisterie Opératoire, Liée au Traitement de la Carie Dentaire.

This is a neat-appearing treatise on Operative Dentistry by the editor of "L'Odontologie." The first two hundred pages are devoted to the pathology and therapeutics of dental caries. The author divides decay into four classes or degrees, as he styles them, and considers each separately, a very admirable method indeed. The remainder of the book is given to Operative Dentistry, including filling, pivoting, bridge-work, implantation, extraction, and anæsthesia. We may congratulate Prof. DuBois on the mechanical execution of his book as well as the context, which is exceedingly well systematized, and shows the author to be well posted upon the subjects.

DIE MICROORGANISMEN DER MUNDHÖHLE is the title of Dr. W. D. MILLER'S book, recently issued in German. It is gotten up in the style so common in Germany, being unbound and uncut. It contains three hundred pages, and is replete with information regarding the micro-organisms found in the mouth. Much of the text has already appeared in the Independent Practitioner, and is familiar to its readers, especially the portions directly relating to decay of the teeth. Several chapters have, however, been added on the general subject of micro-organisms and the whole thoroughly rewritten. We understand that the S. S. White Dental Manufacturing Company have assumed the responsibility of its translation

and issue in English. We would advise our readers to purchase it, as it will form a complete volume of the researches of Dr. Miller to date.

It is not our custom to notice catalogues in our reading columns, but the one received from the S. S. White Dental Manufacturing Company on porcelain teeth is such an exception to the ordinary catalogue that we forbear the rule. It contains one hundred and fifty pages, the first fifty of which are devoted to a scientific presentation of the law of correspondence and temperament in relation to the selection of artificial teeth. The whole forms a very instructive treatise on the subject of prosthetic dentistry, as far as it relates to the selection of artificial teeth, which is the most important part of the art, for without a complete knowledge of the temperamental aspect of the question no prosthetic dentist can consider his education complete. There are but few men in the profession who would not be benefited by a careful study of the catalogue, for it is replete with information from cover to cover.

We are also in receipt of a number of reports of society proceedings and pamphlets,—to wit:

PROCEEDINGS OF THE CHICAGO DENTAL SOCIETY, 1889; TRANSACTIONS OF THE ODONTOLOGICAL SOCIETY OF PENNSYLVANIA, 1886, 1887, 1888; PROCEEDINGS OF THE NEW JERSEY STATE DENTAL SOCIETY, 1888; TRANSACTIONS OF THE PENNSYLVANIA STATE DENTAL SOCIETY, 1888. THE CONSTITUTIONAL TREATMENT OF CARIES AND NECROSIS, and DIASTATIC FOOD IN THE TREATMENT OF CHRONIC DISEASES AND DEFORMITIES OF THE BONES OF CHILDREN, by HAL C. WYMAN, M.S., M.D., Detroit; Cysts of the JAW, WITH THE REPORT OF A CASE, by J. L. GIST, M.D., Jackson, Michigan.

Foreign Correspondence.

TO THE EDITOR:

The following case in practice may be of interest to others besides myself, because, there being three methods, by either one of which the articulation could have been restored, it presented the difficulty of deciding which method would, under the circumstances, be the best to adopt.

The patient is a German, and came to me about eighteen months ago, in order to consult with me as to the best means I would suggest for the regulation of his teeth. I had reason to believe he had consulted with others, and it was upon my decision that he consented to let me operate.

He had worn his teeth away in a manner that I have seldom seen. The chief sufferers being the lower molars, canines, and incisors, and the upper canines and bicuspids, disclosing, when his mouth was opened, a most irregular state of affairs. What really brought him to seek relief was the fact that the upper centrals were literally wounding the lower gums, so much so that he could not eat; otherwise, terribly worn as were his teeth, they did not pain him in the least. My first impulse was to effect a radical cure, and extract the majority, if not all, of the teeth, and make him an artificial denture complete. But a good-Samaritan kind of feeling came over me, and I thought, under the same circumstances, I should not like any one to suggest a similar thing to me in cold blood, if there was any other way of operating. Then I bethought me to kill the pulps of the worst teeth, and build them all up with gold tips; but what an operation for the poor patient, - what hours he must have spent with his mouth wide open, thinking as kindly (?) of me as he possibly could! At last it occurred to me to cap the teeth as they stood with gold, by which means I need not destroy a pulp, and, moreover, the greater part of the work could be done in the laboratory. I stated the plan to him, and he consented.

I first made the caps for the lower molars, opening the bite to its normal length, and when temporarily placed, I utilized the same sitting to make the caps for the lower canines; taking them off, they were finished ready for the next day. When he again pre-

sented himself, I fixed temporarily the four caps, and made two more,—one on either side,—for the lower bicuspids. In such manner all the caps were made to articulate, retaining the articulation in its natural position.

Then came a grand day, when, after making undercuts where I could with safety, I cemented the twelve caps or crowns into their positions at the same sitting, and extracted the roots of the incisors, they being so bad as to be useless for crowning. When the gums had thoroughly healed, I took an impression, from which I made him an artificial piece, in gold and vulcanite, to supply the place of the lost incisors. I think the method I employed—namely, of making all the caps first and cementing them on at one sitting—was the right practice; otherwise—and it would have occurred if I had decided to tip with gold—he would have passed some enjoyable (?) days first with one cap, then two, etc., entirely preventing him from eating until the whole of the work was complete.

I have seen him frequently since, and he says he eats with perfect ease with his golden teeth, and is thoroughly contented.

H. H. EDWARDS.

MADRID, SPAIN.

TO THE EDITOR:

The new officers of the American Dental Society of Europe are: President, Dr. Patton, of Cologne; Vice-President, Dr. Davenport, of Paris; Treasurer, Dr. Adams, of Frankfort on the Main; Secretary, Dr. Bryan, of Basel.

Owing to the International Medical Congress in Berlin, next August, which most of the members will attend, the next meeting is arranged for the first Tuesday in August, 1891, at Heidelberg. Personally I regret this delay, but those most interested in the Society voted in favor of it, and instanced the success of this year as evidence that a biennial meeting is not disadvantageous.

L. C. BRYAN, Secretary.

BASEL, SWITZERLAND.

Domestic Correspondence.

TO THE EDITOR:

We noticed an editorial article in the October number of the Dental Review, written in reply to a letter published in the same number of that journal from the pen of Dr. Allport, which, to our mind, needs a few words of comment.

The editor of the Review could not have done more wisely than to have accepted the suggestion for a "Memorial" meeting of the American Dental Association in 1892, and thrown what influence he might have in that direction.

But for reasons best known to himself, he thought best to put his editorial veto upon the suggestion, and upon the best interests of the National Association of the dental profession of America,the society which has elevated him to the next highest position in its power to give, -- and turn the influence of his journal towards an International Dental Congress, which, I was about to say, nobody in America wants. This statement, however, would not be correct, for there are a few who seem very anxious for it.

The suggestion of a "memorial meeting," by Dr. Allport, was called out by a previous editorial in the Review for September, which lamented the evident lack of interest in the affairs of the Association; the object being to set on foot a plan for stimulating the flagging interest, and placing the Association again in its old field as the foremost society of its kind in our land.

If an International Dental Congress is to be called, the proper parties to do it are a majority of the members of the American and Southern Dental Associations.

It has been customary in like gatherings for the National Association to extend the invitation, appoint the committees, and make all the arrangements.

At the meeting of the American Dental Association, held in August last, this question was made a special order of business, in order that there might be a free discussion of the whole matter. The whole question, however, went by default, as nobody seemed to feel that such a Congress was needed in America. It was well enough to hold a Congress in France, and doubtless it was productive of great good.

Such would have been the case if a meeting could have been held in this country thirty or forty years ago, before the profession was so thoroughly organized as it is to-day. At the present, the profession of America does not need it, as we are well organized and are recognized as a department of medicine, and identified with the International Medical Congress as one of its most important departments.

We were sorry also to see the spirit manifested by the editor of the Review in speaking of the members of the Association who were also members of the dental section of the American Medical Association. He must have been a little out of temper, certainly, when he penned the following paragraph: "First and foremost is the evident tendency of the members of the dental section of the American Medical Association to control the American Dental Association and direct its policy. . . . The efforts spent in this direction, if they had been directed to the more profitable channels of preparing papers and presentation of scientific work in the meetings of the Association, would not now call for a 'memorial' meeting of the Association in 1892."

In the first part of this paragraph he unintentionally pays the members of the "dental section" a very high compliment, for, if our memory serves us correctly, there were but six active members of this section in attendance at the Saratoga meeting of the American Dental Association, who, by the way, are all loyal members of the last-named society. We were not aware that these six, or any other number of the dental section, had such great influence in the Association, or that they had ever tried unlawfully to "control" or "direct the policy" of the Association. It is true, they have tried to exert an individual influence for good, as it seemed to them, but never, to our knowledge, have they been found upon that side which, for selfish reasons, would attempt to destroy or cripple the old and honored national society, and upon its ruined or dismembered body to build a rival institution or an International Dental Congress. Such an institution could be of no permanent value to the profession of this country, and would only tend to weaken the existing societies.

In the latter part of the paragraph quoted the editor of the Review would convey the idea that the members of the dental section did nothing to advance the scientific interest of the meeting. By way of refreshing his memory, we will state that two of the six just mentioned (Drs. Talbot and Sudduth) read papers of scientific interest to the Association, and that all but one took an active part

in the discussions of scientific and other matters brought before the society; and four of the six before mentioned read papers in the dental section of the American Medical Association; while, on the other hand, the editor of the *Dental Review* reserved his strength for a paper which he read, not in the American Dental Association, but in the International Dental Congress, held a little later in Paris. "Consistency thou art a jewel."

JOHN S. MARSHALL.

CHICAGO, ILL.

TO THE EDITOR:

Enclosed please find a few practical points that may be of use to your readers. As time passes, teeth that have lost their pulps seem to lose also, in an increasing degree, the elasticity of dentine which enables them to withstand the normal strain of mastication. The result is that many pulpless teeth are broken by the force exerted against them through their antagonists in the opposite jaw. How many wrecks of bicuspids and badly-broken molars might have been guarded from such a deplorable condition as we find them in. when their owners bring them for repairs after the break, if their lingual cusps had been ground off, so that the force exerted against them could not have been expended in such a direction as to produce such disastrous consequences! The splitting and breaking of the inner sides of pulpless bicuspids and molars, which so generally extends some distance under the gum, is an entirely preventable accident. It requires a strong conviction and firm purpose in preventive treatment to mutilate a tooth by grinding off its inner cusps, but when the pulp has been lost, it seems to be a clear case of the need to choose between evils. Either heroically remove that portion of the tooth against which the force can be exerted to split off the inner fourth or half, or else permit your patient to run the risk of loss you can but poorly repair, with the knowledge that whenever the occlusion is anything like normal, such damage is almost certain to result, sooner or later. The grindstone need remove only one-fourth or less of the amount of tooth-structure that will probably be removed by the break, to make the remainder perfectly safe from such ill-fated liability.

Retaining Pits.—The term seems to be a misnomer. Few fillings are or could be retained permanently by pits. The general shape of a cavity must be such as to retain a filling, or it will not remain. The drill-holes made in the dentine, called "retaining pits," can at

best only retain the part of the filling anchored in them, while more is added in the process of construction; and for this purpose. even when a cavity is well prepared, they may be reduced to a minimum. One shallow pit in one corner will almost always serve the purpose, and even this may be frequently dispensed with. The practice of drilling pits in the bottom or sides of cavities, to start or retain fillings, is undoubtedly responsible for the death of many pulps. The latter do not tolerate the near approach of a conducting material, when that proximity is suddenly thrust upon them in drilling into sound dentine, for instance, in nearly so great a degree as when the approach of irritating agents has been more gradual, as in the slower advance of decay. Yet in the latter case it is a common and wise practice to interpose some non-irritating, non-conducting medium, where cavities are deep; but if it so happens that there appears to be a difficulty in starting or making a filling, it is not uncommon, it appears, to not only dispense with the non-conducting medium under the filling, but in addition to immensely increase the danger to the pulp by drilling one or more holes into the sound dentine, into which one of the best of conductors is packed. Fortunately, the increasing use and appreciation of non-cohesive gold is making the dangerous and seductive retaining pit less important in the process of constructing gold fillings.

J. MORGAN HOWE.

NEW YORK CITY.

TO THE EDITOR:

As the saving of time is an object to most dentists, I will describe a process of soldering small pieces of gold work, which, though not new to all, may be of service to many. If you have a plate with two or three teeth which you wish to attach by means of solder, back the teeth and fasten in position by means of hard wax; then take moulding-sand and wet it thoroughly, until it is of the consistency of soft putty; place this on your soldering block, press the plate into it, and bring the sand well up around the teeth. Now take your blow-pipe and throw a broad, gentle flame around the outer edges of the sand, taking care not to let the flame touch the plate or teeth until the water is driven off and the wax begins to blaze; then direct the flame upon the wax and burn it off. Scrape well the parts upon which you wish the solder to flow; then place on the solder and borax, and proceed as usual. Partly fill a sauce-pan with water, and place it over a gasor oil-stove, and when it boils hold the case, wrapped (investment and all) in a cloth, over the steam for half a minute close to the water; then drop it in, remove and take out the piece. Clasps and small regulating pieces are held together and soldered by this process very quickly.

I have yet to crack my first tooth by soldering in this manner, which, I think, is due to the fact that the expansion by steam heat is more uniform than by dry.

Sand which has been used for moulding purposes is dangerous to use, as particles of zinc or lead may be present, and thus become alloyed with the gold.

J. Bond Littig.

NEW YORK CITY.

TO THE EDITOR:

Since the publication of my paper on "The Bonwill Method of Packing Gold Foil," in the September issue of your journal, I have been made conscious, through inquiries, as to certain details of the method which I tried to explain, that my description in the paper has failed to make sufficiently clear one item of especial importance, -viz., the character of the surface of the plugger-points used. What I said in the paper with reference to this was as follows: "The use of this method demands that the plugger-points, whatever their size, angle, or general form may be, shall have slightly convex faces, with extremely shallow serrations and rounded edges, so that they shall not tear the gold." This statement should have been made fuller and more explicit. The points which were originally furnished to me by Dr. Bonwill were serrated about as finely as those of the Varney set of instruments, when they came from the hands of the maker; but before sending them to me, Dr. Bonwill, as I afterwards learned, had removed nearly all of the serrated surface by rubbing the points over an Arkansas stone, so that, when they came into my possession, while the lines of the original serrations were distinctly visible, the surface of the plugging-point was nearly smooth. Subsequent use has rendered them entirely so, and they have never been recut. All the points which I have since had made for my own use have gone through the same treatment by having the sharpness of the serrations obliterated by the Arkansas stone. It is, of course, obvious that any serration, in the ordinary sense, would be fatal to the efficiency of a plugging-point when used for packing gold by the method under consideration, the whole spirit of it being dependent upon the sliding or planishing movement of the tool as described. Hence, the older and more worn the plugging-surface of the point becomes, the greater its efficiency within reasonable limits.

I have recently learned that Dr. Bonwill uses in his own work uncut points, absolutely devoid of serrations, which are smooth like burnisher-points. This fact I was not aware of at the time my paper was read. Nor have I had any experience with the use of such points; but, as a matter of fact, those which are in daily use in my office are probably as smooth and as devoid of serration—as a result of the usual wear and tear—as those which have never been serrated. I trust the foregoing explanation may help to render clear what I had to say in reference to a method which has made for me the packing of gold foil in teeth a pleasure instead of a laborious and fatiguing process.

EDWARD C. KIRK.

PHILADELPHIA.

Current News.

FIRST DISTRICT DENTAL SOCIETY, New York, January 14, 15, 16, 1890. Keep the date in mind, and your appointment-book free.

Dr. J. N. Crouse will, in all probability, be there, and may want to "see" you, as the civil suit against him is set for some time about the first of the year.

At any rate, you had better "see" Dr. Crouse, in order to protect yourself against civil suits or injunctions. Remember it only costs ten dollars to get a guarantee against all costs in case you are sued.

To rotate a tooth, Dr. R. B. Adair has a platinum band, to which is soldered a little cylinder; one end of a coil of very fine piano-wire is placed in the cylinder; the other is flattened and passed between the teeth. Almost any tooth can be thus rotated in two or three days with very little soreness or annoyance.

Dr. H. S. Colding holds that dentists are born, not made by colleges. He also thinks that the practice of dentistry is two-thirds mechanics and one-third common sense, medicine, and surgery.

Predisposing Causes.—Nationality has a supposed predisposing influence, but statistics are not sufficiently accurate to warrant definite conclusions upon this point. Heredity has its undoubted effects, particularly in determining the forms and arrangements of the teeth, and, in a more ill-defined way, of transmitting from parent to child the peculiar character of cellular elements, rendering the child susceptible to disease. To malformation of individual teeth is directly traceable one of the causes predisposing to caries.

W. C. WARDLAW.

At the Georgia State Meeting, Dr. S. A. White reported the case of a child brought to him suffering from a very sore nose, with a very painful protuberance in one nostril. Examining the teeth, he found the right lateral and the left central incisor touching, with no trace of the right central and no room for it. The teeth being separated, in a short time the soreness of the nose diminished, the protuberance disappeared, and the missing central incisor came down all right into place.

In the treatment of chronic alveolar abscess, Dr. R. B. Adair uses a delicate bulb made of platinum and slightly curved at the end, so as to follow the track; the point is heated to red heat, and pressed on a stick of nitrate of silver, which adheres to the point and hardens; this is carried to the bottom of the abscess, and turned around so as to cauterize the edge of necrosed bone, destroy micro-organisms, and stimulate to healthy action.

PRESIDENT S. A. WHITE, of the Georgia State Dental Society, thinks it the duty of the State Society to help the young men, especially by making them members of the Society. Their college expenses have been heavy; fitting up an office is a heavy expense; travelling expenses to meet the State Examining Board must be met; their license fee must be paid,—all before they can honestly earn their first dollar professionally.

INSTEAD of a plate covering the roof of the mouth, Dr. S. A. White sets the teeth on a gold band or wire one-fourth of an inch wide, making a skeleton-plate which is very strong and worn with absolute comfort.

Dr. B. H. CATCHING thinks the admission to their State Society of young men fresh from college should not be made a matter of dollars and cents. They are the material with which to build up the profession in the State, and, adopted from the start with their State Society, they will grow up with its best interests at heart.

Dr. Sid Holland thinks that a young man who has not sufficient natural ambition to pay his own initiation-fee into his State Society is not worth "fostering." He is not made of the right material to build up a society with.

Dr. Geo. H. Winkler finds that bichloride of mercury forced through the apex gives very severe toothache.

Notice.—The First District Dental Society of the State of New York will hold its twenty-first anniversary in New York City, January 14, 15, and 16, 1890, on which occasion every practising dentist will be cordially invited. Special railroad and hotel rates will be made. Please note date of meeting, and make your appointments accordingly.

All communications should be addressed to the Executive Committee.

W. W. WALKER, Chairman,

67 West Ninth Street, New York City.

Pennsylvania Association of Dental Surgeons.—At the annual meeting of this Society the following officers were elected to serve for the ensuing year: Howard E. Roberts, President; C. F. Bonsall, Vice-President; Theodore F. Chupein, Recording and Corresponding Secretary and Reporter; W. H. Trueman, Treasurer and Librarian.

MARYLAND STATE DENTAL Association.—The sixth annual meeting of the Maryland State Dental Association will be held in Baltimore on Thursday and Friday, December 5 and 6. The programme will consist of reports from committees, essays, clinics, and displays of dental specialties.

D. F. Penington, M.D., Recording Secretary. E. P. Keech, M.D., D.D.S., President.

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Original Communications.1

A STUDY OF ELECTRICITY, WITH THE VIEW OF COMPREHENDING ITS APPLICATION IN DENTISTRY.²

BY HOWARD E. ROBERTS, D.D.S., PHILADELPHIA.

In preparing this paper for your consideration I have found it difficult to express my ideas without defeating the object for which it is written. To those who have given the subject much study, or who are practical electricians, my paper will be of little interest, but as it is to those who are not so well posted in the subject that I wish to address my remarks, I trust you will pardon me if I repeat what you are already familiar with. It is difficult to understand and remember if we do not know and see the reason why; therefore, I will try to explain some of the laws and define some of the terms used, making use of as few technical terms as possible, and defining those I have to use.

In many ways electricity may be compared to a stream of water, and, as we can see and measure the water, it makes it easier to understand and appreciate the laws which govern the electrical

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¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in this country. The journal is issued promptly on the 15th of the month.

² Read at the twenty-first annual meeting of the Pennsylvania State Dental Society, held at Cresson, Pa., July 30, 1889.

current. One difficulty which many have in trying to understand many of the terms used in connection with electricity comes from the impossibility of being able to see and handle,—you might say there is nothing tangible to work from.

In order to speak intelligently about electric currents, there are three terms or words the meaning of which it is necessary to understand. They are the Volt, the Ohm, and the Ampère, and they are so related that by Ohm's law, if any two are known we can determine the third. The volt is the unit of pressure, the ohm is the unit of resistance, and the ampère is the unit of volume or quantity.

In defining these terms I will first take the unit of resistance. If it were water or steam we were considering, we could say that the unit of resistance would be the resistance offered by a pound weight, and with water flowing through a pipe the resistance would be the friction of the water against the sides, which would be represented by so many pounds. Every wire or conductor, or nonconductor either, offers a certain resistance to the passage of a current of electricity, and the resistance which is offered by a column of pure mercury 106 centimetres long by one square millimetre cross-section at 0° C. has been accepted as the unit of resistance, and has been called the ohm. One mile of ordinary telegraph wire has about 13 ohms resistance. As we have a unit of resistance, we must have a unit of pressure to overcome that resistance, and it is called the volt. One volt will overcome a resistance of one ohm. With water we would say there was a pressure of so many pounds, and with electricity it is a pressure of so many volts; in either case it is a pressure to overcome a resistance. The ampère is the unit of volume or quantity; with water it would be the gallon, but we cannot measure electricity as we would water, though we can measure the effect that a given current will produce in depositing a given metal from its salt held in solution, and the deposition is directly proportional to the current.

The quantity of electricity that will pass in one second through a resistance of one ohm when the pressure is one volt has been taken as the unit of quantity, and is called the ampère. One ampère will deposit $\frac{147.253}{1.000.000}$ of one grain of silver in one second. It is said that one volt will overcome a resistance of one ohm, and it is a little difficult to understand or catch the exact meaning of it. I think a pipe carrying water will help us to understand. Suppose we have 1000 feet of pipe which we can lay perfectly level; now turn up both ends and fill the pipe with water; if either end is elevated,

say one inch, the water will flow slowly from the other. An elevation of one inch would represent a pressure of about $\frac{1}{24}$ of one pound; now increase the elevation of that end to two feet, which will give about one pound pressure, and we will find the water to flow about twenty-four times faster. If, on measuring the water flowing from the pipe, we found one gallon to flow in one second, we would say that one pound would overcome the resistance of the pipe, so that one gallon of water will be discharged in one second, and one volt will overcome the resistance of one ohm, so that one ampère will be discharged or flow in one second, which is one way of writing "Ohm's law."

If we increase the voltage while the resistance is kept constant, we will increase the number of ampères, or, if the resistance is increased with a constant voltage, the number of ampères will be decreased, and the increase or decrease will be in direct proportion. Divide the volts by the ohms,—that is, the pressure by the resistance,—and the quotient will be the ampères.

By the "difference of potential" is meant the difference of pressure or level, and the earth is taken as zero potential in the same way that the ocean is the zero for water level, the current flows from the higher to the lower potential; we say there is a difference in potential of so many volts.

I have not given as much attention to the galvanic battery as I have to some other parts of the subject; however, I may be able to give you some ideas that may help you to explain some things which you do not now quite understand.

I believe there are two theories about the generation of electricity with the battery. One is that it is due to chemical action, and the other is that it is simply the contact of different metals or substances, and that it is the contact which produces the chemical action. The plates of a battery are supposed to be of different potentials, and, as the current falls from one to the other through the external circuit, the battery fluid serves the purpose of a pump, as it were, to raise it from the lower to the higher potential, so that it can again fall, and thus keep up a continuous circulation.

How much power can be gotten out of a battery, and how is the best way to arrange the cells, are questions frequently asked. The power of one horse is supposed to be able to lift thirty-three thousand pounds one foot in one minute, or five hundred and fifty pounds in one second. The electrical equivalent of the horse-power is seven hundred and forty-six watts. A watt is one volt multiplied by one ampère,—a volt ampère, as it is called,—and any combination of volts and ampères which when multiplied will give seven hundred and forty-six will represent one horse-power.

For instance, the horse-power may be one ampère and seven hundred and forty-six volts, or it may be one volt and seven hundred and forty-six ampères, and one volt and one ampère will be $\frac{1}{146}$ of one horse-power.

Ohm's law is one of the most important of electrical laws, and is the key to the distribution and use of electricity. The law is, "The strength of a current in a wire or conductor is in direct proportion to the difference of potential between its ends, and inversely proportional to its resistance," and the units are so chosen that one volt will overcome the resistance of one ohm, so that one ampère will flow in one second. You may divide or multiply and split your current and conductor as you please, but the law will hold good.

Let us now consider the power of a battery-cell. Take a simple plunge-battery having two carbon plates and one zinc, it will give about two volts and, we will say, ten ampères on short circuit,—that is, with no external resistance. Multiply two by ten, and we have twenty watts; divide 746 by 20, and we have $\frac{1}{87.3}$ of one horse-power. But before we can use that power, we have to introduce a transformer, say a motor or mallet, which will have some resistance, say one ohm.

The cell that will give ten ampères with two volts must have an internal resistance of $\frac{1}{5}$ ohm, for the volts divided by the ampères will give the resistance. If we add the external and internal resistance, we get $1\frac{1}{5}$ ohm; divide the two volts by that, and we have $1\frac{2}{3}$ ampères, which is multiplied by the two volts, giving $3\frac{1}{3}$ watts, which is a very small part of a horse-power, being only $\frac{1}{2}$.

We will now take six cells of the same kind and arrange them in series,—that is, with the carbon of one cell joined to the zinc of the next, etc. The external resistance is the same, but the internal is six times as great, or $1\frac{1}{5}$ ohms; add the external and internal resistance (= $2\frac{1}{5}$ ohms), and divide the volts, which would be 12, by it, and we have $5\frac{5}{11}$ ampères of current; multiply 12 volts by $5\frac{5}{11}$ ampères, and we get $65\frac{5}{11}$ watts; divide 746 by that, and we get a little less than $\frac{1}{11}$ horse-power.

In connecting the cells in series you increase the voltage, but the ampères remain the same; while with the cells in parallel, that is, all the carbons connected to one pole and the zincs to the other,—you increase the ampères by decreasing the internal resistance, but the voltage is the same as for one cell. Though the watts of the battery would be the same on short circuits in either case, the power through the resistance of one ohm with the cells in parallel would be but little better than for the single cell.

In regard to the arrangement of the cells to give the best results: it is said, to so arrange them that the internal and external resistance shall be the same will enable you to get the greater amount of work from the battery, and therefore that should be the best and most economical arrangement. The idea is that, as the resistances are equal, there would be an equal amount of heat used in either circuit, or fifty per cent. of the total energy, and that with a perfect transformer of power you could never realize more than half the power developed by the battery. If you want to do the greatest amount of work in the shortest time, I believe that arrangement of cells will do it, but I think it is not the most economical arrangement.

In every case where electrical energy is converted into mechanical there is generated what is called a counter-electromotive force. If this counter-electromotive force equals the electromotive force of the battery, there would be no current flowing; consequently there would be no heating, and no work would be done. Electromotive force means the pressure of the current, or the number of volts given by the battery, and is generally written an E. M. F. of so many volts. The heating of the circuit is in proportion to the square of the current. The counter-electromotive force acts as a resistance, inasmuch as it reduces the current, and it should be as great as possible, to allow enough current to flow to do the work. Make the internal resistance of the battery as small as possible,—that is to say, use large carbon and zinc surfaces. The heat in the cells is wasted; you can only use the current in the external circuit.

In the calculation of the battery power, it is the electrical and not the mechanical power you get; there is always a loss in the conversion of energy.

In converting the heat-energy of coal into mechanical, in the best and largest engines we cannot recover more than twenty per cent., while the locomotive engine, I believe, uses about eight per cent. With a good motor about ninety per cent. of the electrical may be converted into mechanical energy.

In regard to the storage battery and its care I feel that I know little, but as there may be some here who know less, I will try to define it.

Take two plates of lead and place them in dilute sulphuric acid (ten-per-cent. solution), and pass a current from two or more cells through them for a short time; upon disconnecting the cells and connecting the lead-plates you will get a current in the opposite direction, which will only last for a short time, though it may be of large volume; if the plates are charged and discharged a great many times in opposite directions, which is called forming the plates, they get a spongy surface upon them, when they are capable of receiving a large amount of electricity and returning a large portion of it. (Planta.) The forming process took several weeks, and was very tedious. Now the plates are generally coated or filled with oxide of lead in some manner, so that once charging forms the plates.

The storage-cell gives about 2.25 volts when freshly charged, which soon falls to 2, and is held at that for the greater part of the discharge. You cannot recover all of the electricity which is put into the cell in charging, but you can recover in a useful form a current which would be too small to use either with a lamp, cautery, or motor. The storage-cell may be charged with a battery of gravity-cells which would give a very small current. But it would take many hours' charging to get one hour's work, and the rate of discharge will depend upon the resistance of the circuit.

Before considering the use of the electric-light current in our offices, I think it would be well to understand a little about the generators of the current or the dynamos.

Professor S. P. Thompson's definition of a dynamo-electric machine is, "A machine for converting energy in the form of mechanical power into energy in the form of electric currents, or vice versa, by the operation of setting conductors to rotate in a magnetic field, or by varying a magnetic field in the presence of conductors." The generators may be divided into two classes,—that is, those giving a continuous current, or a current flowing in one direction; and those giving an alternating current,—that is, the current that flows first in one direction and then in the other, the alternations being very rapid.

The alternating current is not adapted to run the mallet, neither are there motors for that circuit very well adapted for our use; therefore I will not consider that current or its generators further.

The continuous current generators may be again roughly divided into those giving currents of high and those of low potential or voltage, though this is a comparative division. The dynamo to give a high potential current has many turns of rather fine wire on its armature, and is intended to give a current of small volume and great pressure, while the low potential dynamo gives a large cur-

rent at low pressure, and has few turns of large wire or copper bars on its armature. One generator may give 10 ampères at 1000 volts, or 10,000 watts, and another would give 100 ampères at 100 volts, which also would be 10,000 watts, requiring the same power to drive them, and giving out the same power. The dynamo giving 100 volts would be called a low potential machine, and you could handle the wires without danger and with but little care, while a shock from the 1000-volt machine would probably prove fatal; the wires would be dangerous things to fool with, and they must be handled with great care.

The question is naturally asked, Why is one machine, or the current from one machine, dangerous, and the other harmless, when they both represent the same power? The answer comes from Ohm's law in this way. The resistance of the body from hand to hand with a dry skin is something like 3000 ohms, with the skin wet and making good contact, it will be in the neighborhood of 1500 ohms. If we have 100 volts with a resistance of 3000 ohms, we would only get one-thirtieth of an ampère through the body, while with 1000 volts there would be ten times as much, or one-third of an ampère. It is the ampères which do the work, and the volts are only necessary to overcome the resistance of the circuit, so that the required number of ampères can flow. You can take a spark from a Holtz machine which may be 1,000,000 volts without danger, because the current is infinitesimal.

The dynamo does not generate electricity, but it does generate a difference of potential; the amount of electricity flowing will depend entirely upon the resistance of the circuit, if the difference of potential is kept constant.

The arc light is generally placed on a circuit of high potential, while the incandescent is used with a low potential. The arc-light current, or the current of high potential, should never be introduced into the dentist's office for the purpose of using it to run the engine or mallet, or for any other purpose where the conductors have to be handled or brought in contact with either the patient or operator. The current could be handled and used all right if it were possible to be certain that the insulation of the wires would never fail, but, as that is an impossibility, no one has a right to expose himself, and particularly his patient, to a possible injury.

The incandescent current of 110 volts is higher than we want, but it is impossible to hurt your patients with it without making a special effort, and even then it would be very difficult to do more than burn them some. In using the incandescent current to run

the engine an electric motor is used, which is so constructed that the full current can pass through without any external resistance being introduced, when the motor will run at its maximum speed; it will also generate a counter E. M. F. nearly equal to the E. M. F. of the dynamo.

To regulate the speed, there is used what is called a resistance-box, in which is wound a number of coils of German-silver wire, and by pressing a lever with the foot more or less of the wire is thrown into the circuit, and in that way regulating the amount of current passing through the motor, and consequently the speed. It is theoretically possible to get a better method of regulating the speed of the engine, but whether it is practical, I have not yet determined.

If a motor wound for use with a battery were put in an incandescent circuit without any external resistance, there would be so much current pass through, on account of its low resistance, that it would be burned out; and if resistance were added until only the number of ampères for which the motor was wound could pass, there would be a great many watts wasted; and if the watts were reduced to the watts of the battery, the motor would probably not go at all. The motor has to be wound for the number of volts of the circuit on which it is to be used.

In using the incandescent circuit for running the mallet there has to be a very decided change in the potential,—that is, it must be reduced.

Where there is a potential difference of about 30 volts, it is possible to produce an electric arc, and when the arc is formed the current is not broken. As the action of the mallet depends upon the interruption or breaking of the current, the mallet would not work where there was a potential difference of 30 volts, because an arc would be formed at the interrupter.

I believe the mallet will work best with from 4 to 6 volts, or say three cells, so that the volts ought to be reduced to about that number. Adding resistance will reduce the current, but not the volts; therefore some other means has to be found.

In the apparatus gotten out by the S. S. White Dental Manufacturing Company, resistance is introduced in the form of three lamps, so as to reduce the current to about two ampères; the current is then divided, part passing through the mallet, and the rest through a variable resistance which is less than the resistance of the mallet, so that most of the current passes through the variable resistance. The mallet works nicely, the arrangement is simple,

and there is very little to get out of order. The current used represents about one-third of a horse-power, a small part only of which is used in the mallet. When the current is measured by meter and charged for accordingly, one-third of a horse-power costs less than three cents an hour. A motor of sufficient power to drive the engine should not cost as much per hour.

The electric motor is the reverse of the dynamo, and depends for its power upon magnetic attraction and repulsion, or upon the attraction and repulsion of a magnet for a conductor carrying an electric current, or both.

The amount of magnetism induced in an iron bar will depend upon the number of ampères passing around it, and is independent of the volts. With a given bar of iron the magnetism will be the same if 100 ampères is passed once, or 1 ampère 100 times around it.

Any one who wishes to use the incandescent current in connection with dentistry should always remember Ohm's law, should give study enough to the subject to understand the principle upon which the appliance they use is founded, and understand its construction. The use of electricity in dentistry is in its infancy, and there is room for improvement in the existing appliances and for new ones.

I think there are few who, having used the incandescent current and understanding its use, would be willing to give it up.

PYORRHŒA ALVEOLARIS.1

BY GEORGE S. ALLAN, D.D.S., NEW YORK CITY.

In reply to your kind invitation to read a paper on pyorrhea alveolaris, I wish to present such thoughts and principles to you as have in the main guided me in my practice, and not a rehash of clippings and theories from text-books and the current literature. On one or two minor points only do I claim anything original. It would be difficult, indeed, to go over so well beaten a track and find much that was new, or garner much where so many reapers have gone before. Doubtless, as I go on, many of you will recognize the theories and principles of the authors you are most familiar with, and will give them their proper credit. I do not wish or intend to make the slightest effort to steal their thunder. I give them full credit, and gratefully acknowledge my indebtedness. One name only will I refer to, and that one I could not well omit; I owe him far more than all others combined, for he has given us the most complete, concise, and philosophical papers on this as well as kindred topics that we possess. I refer, of course, to Dr. Black, of the Chicago College. Until he took the subject in hand and whipped it into shape, we had nothing but a medley of crude theories, and still cruder methods of practice. Now, all is changed, and we can walk rapidly over a road well paved with facts and lighted with principles. I gladly take this opportunity to render thanks where thanks are so well due.

It seems very strange to many who have given attention to the subject, and have such cases as we are to consider constantly before them, how little the profession in general is interested in them and how universally they are put to one side,—neglected or avoided altogether. Nine cases out of ten, at least, that come into my hands have the same story to tell of how they had thought a cure, or even a relief, was impossible, for their dentists have told them "there was no hope; the trouble being constitutional, in their blood, and nothing could be done." More professional crimes are committed in this department of our practice than in any other I know of, for I hold it is a crime for a dentist, to whose professional skill and care

¹ Read before the New Jersey State Dental Society, at its nineteenth annual session at Asbury Park, July 18, 1889.

a patient commits himself, to offer him ignorance where he expects knowledge, and mislead him as to his chances and opportunities for a cure. Still less is it excusable for a dentist to allow, in any case, his patient to acquire the disease while he is in his care. If my views are well founded, its beginnings are always capable of being easily detected and as easily warded off. I would be heartily ashamed of myself if a patient of mine acquired it during the time his or her teeth were in my charge, unless it was through such neglect on their part as would make my directions and work on their teeth useless for warding it off. I cannot lay too great stress on this point, and repeat my assertion that the blame rests on the dentist in all such cases.

I have taken some pains to accumulate statistics as to the relative numbers and importance of the teeth lost in this way as compared with those lost by decay. Of course, they are incomplete and only relatively valuable, still they are impressive, and should wake us up to the importance of the subject and of our duty in studying it in all its phases. I will give you the net results only of my investigations. 1st. The actual number of all teeth lost by pyorrhæa alveolaris (of course, I leave out of this estimate the deciduous teeth) approximates very closely, if it does not actually reach, the number lost by decay (caries). 2d. The molars and bicuspids are affected by it, as compared with the front teeth, in the proportion of two or three of the former to one of the latter. 3d. Middle and old age are specially liable to it, and hardly at all to decay.

As to the difficulties attending treatment. In its earlier stages success is as certain as in that of decay and generally as lasting. In its later stages it is more difficult and far from as promising in good results. The difference is the same in degree that a builder would have in saving a house from destruction whose foundation was gone or badly impaired, or only some of the upper stories out of order.

As I propose, as before intimated, to consider the subject from a personal stand-point, and give you only such thoughts and ideas as naturally present themselves from my own experience, it may be well here to outline, in brief, what I consider to be the characteristics or salient features of the disease, so that you may the more easily recognize it. For convenience' sake I will group the symptoms under two headings,—the manifest and the obscure. Under the first heading will belong those that the patient takes painful cognizance of, and most frequently brings him to your chair; and under

the second, those which it requires the educated eye and touch of the dentist to detect and point out. The former belong to the later stages of the disease, the latter to the earlier.

First and most prominent of the former class of symptoms is the loosening of the teeth. This may or may not be accompanied by a recession of the gums, but most frequently it is. It may come on gradually and unaccompanied by pain, or it may make most rapid progress and cause more or less soreness and inconvenience. A careless patient would have his attention first drawn to the trouble by noticing that one or more teeth felt lame or were tender to the touch, or when eating, but at other times were quiet and peaceful and gave no annoyance. Then on placing one of his fingers, as he naturally would, on the offending member, he would find it had lost some of its firmness and was shaky in its socket.

When, as frequently happens, recession of the gums is the most prominent feature, it will be noticed that on one face of the tooth the root is unduly exposed, the gum having disappeared, but the tooth need not of necessity feel loose, being held in place by healthy tissues on the remaining portions, and may be still further steadied by its neighbors on either side. This we would call a second symptom, and a third symptom appears in a softened, tumefied gum, one that bleeds easily and has a dark purplish color. A fourth symptom would be a bad breath and a disagreeable taste in the mouth. A slight discharge of pus from around the affected tooth or teeth might account for this taste and odor, but not of necessity. All these symptoms may occur, as it were, simultaneously, or any two of them may exist without the third. They all belong to the final stages of the trouble, and precede, without treatment, a limited time only the final loss of the teeth affected. It will be noticed that I only allude to a discharge of pus as a probable incident manifesting itself in the later stages, so sure do I feel that it is not a prominent indication to go by. The dentist who looks for it as an aid in his diagnosis, oftentimes will look in vain, and still the disease may be making rapid progress. The presence of pus comes only as a sequence to an active inflammation, and can be counted on only as one of its signs and indications. It does not represent the disease any more than the interest on a debt represents its principal or what it was for.

In the second class of symptoms, those that require both skill and knowledge to discover, belong a much larger group of symptoms, and really the most important for us to consider; for they lie at the very basis of proper diagnosis and treatment, and as prevention is more valuable than either of these, their due consideration is most important. Just here I may say that the terms symptoms and causes seem to run together, and it is hard to decide where the one begins and the other ends. But, for our purpose, we need not be too particular in the use of words so long as they properly indicate our thoughts, and so, if I call a symptom that which appears to any of you a cause, my explanation will be all sufficient to satisfy your scruples.

To the second group of symptoms or indications belong the following: 1. The gum over the affected tooth will have a slightly darker color than is natural, and, may be, will have fallen slightly away from the root; 2. The instrument can be passed up between the gum and teeth beyond the normal distance, which is about one-sixteenth or one-eighth of an inch; 3. The depth will vary at different points more than it ought to; 4. The border of the alveolar process will be felt by an exploring instrument at one or more points; 5. The neck of the tooth will be unduly sensitive, showing the presence of some irritating agent; 6. The neck of the tooth will be rough and uneven under the margin of the gum; 7. A whitish, milky exudation can be pressed from between the gum and the tooth, not at all, however, like pus or simulating it in color or consistency.

To sum them up, a close examination will reveal departures from the normal, healthy condition of the parts under consideration, slight and of apparently little import, but all having a direct and positive bearing on the future health and safety of the tooth. It is well to give special thought to first causes and to be very careful in treating symptoms. To consider them in their natural order and sequence. A neglect in these particulars may lead to grave errors in judgment, and still graver in treatment. Physicians see this now clearly, and ever-increasing thought is being given in all cases to make their practice as scientific as possible, by considering first of all the etiology of the diseases they are called upon to treat. They recognize the truth of the statement that treatment of disease must be empirical, if not based on a clear conception of its cause or causes, and to-day medical literature teems with investigations and studies in this direction. So it must be with us in our specialty, and in that way only can we make our practice certain and sure.

A word, then, first, in reference to the etiology of pyorrhœa alveolaris. To me it has always seemed that much of the trouble that many dentists meet with in their practice arises from a total

misconception of its origin and cause; and, again, that this misconception is largely induced by our very ridiculous nomenclature. Anything more absurd from a pathological stand-point than this term "pyorrhœa alveolaris" cannot well be imagined. The literal interpretation of the term is, "A discharge of pus from the alveolar cavity." It is a beautiful example of putting the cart before the horse,—of naming a disease by one of its effects,—and ignoring the cause or causes of its inception. But this is a little bit of folly that dentistry has borrowed from medicine. The full beauty of the term with us may be grasped when we consider, first, that the pus in the majority of cases does not ooze from the alveolus at all; and, second, that the disease may and often does run its course without the formation of any pus whatever. Then, again, we find a genuine discharge of pus where it has its undoubted origin from another cause,-from an alveolar abscess, where the discharge takes place from some point or points around the neck of the tooth. In such a case our nomenclature would be perfect and indicative of the disease; it would be a genuine case of pyorrhea alveolaris, and vet no one for a moment would be misled and call it by that name. The name, then, would seem to offer a good excuse for some blunderings in practice, as many, indeed, as the different ideas that dentists might hold of the nature of the enemy they were expected to tackle, whose name was only a cloak with which to hide his form and power. The first step, then, I would advise any one to take would be to discard this misleading term entirely; throw it out of his vocabulary, and to approach the subject from the direction of close observation of facts and conditions as he finds them in the mouths of his patients. Without being able to suggest a short, comprehensive title, one handy for use in conversation, I would group all these lesions under the heading of affections of the peridental membrane, having their origin at the neck of the tooth.

At the June (1888) meeting of the Philadelphia Odontological Society, I made this assertion for which I was strongly taken to task: "I desire to state positively my belief that pyorrhea alveolaris is always preceded by a deposit of serumal tartar. Now it is quite possible that this statement will have to be modified, not, however, to a very great extent. The essential principle or thought I wish to leave undisturbed. If I had said that as a rule the so-called pyorrhea alveolaris had its origin in a purely local cause or causes, and that nine times out of ten this local cause was tartar in some one of its protean forms, I would have rightly stated my opinion. If I had gone farther, and stated that the constitutional

diathesis theory was only one way of begging the question and could not stand close examination, I would have still further enforced the same thought. For if I am convinced of any one thing thoroughly, it is that close observation will almost invariably detect the local irritant at the foundation of the trouble, and that treatment based on this theory assures more favorable results than any other with which I am acquainted. Given a primary local source of irritation, and there are many, some of which we will more especially refer to presently, and the rest follows in the natural order of cause and effect. The utmost that can be said for a systemic origin for the disease is that the inflamed gingivæ or mucous membrane is prone to secrete—if that is the proper expression—lime salts, and that these lime salts, in turn, become an added cause of irritation and inflammation to the already affected soft tissues, more especially when they are deposited on the necks of the teeth and below the free margins of the gums. Of course, all will naturally draw a sharp line of distinction between ordinary salivary tartar which is deposited in thick masses on the lingual faces of the lower front teeth or buccal faces of the upper molars, and is seldom or never of itself the cause of pyorrhœa alveolaris, and the various forms of black and brown tartar that creep under the gums and up on the roots of the teeth. The first mechanically pushes the gums back or lengthwise down the roots of the teeth, but does not insinuate itself between the gums and the roots of the teeth. consistency it is only a semi-solid, and is readily scaled away from the face of the tooth, and, when removed, the soft tissues are found to have been but little affected by its presence; they may bleed a trifle, but practically are in a healthy condition, and soon recover any little loss of tone, once freed from the superincumbent mass. The deposition of this form of tartar may safely be said to be constitutional in that it is not necessarily, or even commonly, preceded by any local inflammation to induce it; but it is not especially dangerous, except through gross neglect, and, as an exciting cause for the disease we are considering, is hardly worth mentioning.

But the black or brown tartar is of another character,—serumic tartar, as Professor Black calls it,—and the name is a good one, as clearly indicative of its origin. It is an exudate from the inner surface of the gingivæ, where they hug the neck of the tooth, an abnormal deposit from the mucous glands in that locality when they are in an irritated or inflamed condition. The physical appearances of this form of tartar vary considerably; but I cannot occupy your time by indicating all of them, the more so as they

will naturally suggest themselves to you without such effort on my part. As a rule, it is invisible to the eye except when, having been present for some time, the overlying gum has been destroyed, and so exposed it. It is, therefore, not found on any portion of the crowns of the teeth, the reverse of the case of salivary tartar. For brevity's sake, I will draw your attention to two conditions only. First, when it is found in a comparatively thick mass lying under the free margin of the gum and longitudinally with the neck of the tooth; and, second, where it takes the form of thin scaly patches, having a smooth, hard surface, and clinging most tenaciously to the tooth. The first form is rather the most common of the two, is more easily detected, and, as it does not cling so closely to the tooth, is the most easily removed. The latter—the one having the thin scaly character—I consider by far the most dangerous. It is the most insidious in its nature, and its first effects are slight and insignificant and easily overlooked. Being smooth and hard, it does not irritate the soft tissues, and consequently there are no outside physical manifestations of its presence until its work of destruction is nearly complete. A delicate touch is not enough to prove its existence, for no touch is delicate enough to tell where the root is coated with it and where it is not, so thin is it, so hard, and so like the root itself. As a rule, we can only surmise its presence by one sign only,-viz., when a delicate instrument can be passed between the root and the gum beyond its natural depth, all other conditions being apparently normal. I would draw special attention to this form of tartar, and wish to take great pains to impress on your minds the necessity of fully comprehending its dangerous nature and the extreme care required to diagnosticate its presence, for I am fully convinced that it is frequently overlooked, and that such oversight leads to fatal errors in practice. It is to the failure to detect it that we hear so much about constitutional causes, and the consequent lame excuses for faulty treatment and unfavorable results. Of course, the dentist who does not see a local cause for a local trouble falls back on the body as a whole to explain away his difficulty and father his failures, and the unfortunate patient is made happy and comfortable with the ready explanation that he owes the loss of his teeth to a bad "constitutional diathesis," and "that nothing can be done for it," and he takes away his sound tooth, after it is extracted, showing only a little discoloration that may be on the roots, to prove the wisdom of his dentist and his unfortunate relations with an all-wise Providence. The medical doctor looks wise and a bit sad as, with a twinkle in one corner of his eye,

he tells his patient he has malaria, and that he cannot hope for much, for his system is full of it, and the dentist in like manner folds his hands and says, "Poor fellow! It is constitutional, and I can do nothing for you. Hold on to them as long as you can, and then I will take them out and make you a nice gold plate with artificial teeth, and you will never know your loss. You don't know, my dear sir, what wonderful strides dental science has made in late years, and how skilfully I can make good your misfortune." If dentist and patient would both take those poor discolored roots in their hands, and give them a careful examination, their eyes might be opened very wide, and they might both exclaim, but with widely different thoughts and feelings, "Is it possible!" The dentist, with his excavator, would find that the discolored patch could be chipped off, thin as it was, and that the healthy root was immediately underneath, and the thought would suggest itself that a foreign body of that character, between the root and the peridental membrane. was not conducive to the health and comfort of his patient; and if it had been removed in time, and in the mouth, and not out of it, might have prevented its loss, and have given him a better claim to the title, "a skilful practitioner." As to the thoughts that would worry the patient, it may well be deemed prudent to say as little as possible. The simple truth is that the various troubles that teeth are heir to have no remote origin. They are so purely local and so close to hand that it seems unpardonable to overlook them. Do not misunderstand me on this point. I fully appreciate the importance of having in mind systemic conditions and influences, and their direct and indirect bearings in diagnosis and treatment, and give full weight to it all, but I do not allow my mind for a moment to be withdrawn from the main fact, that I have to deal with a local disease produced by local causes, and that the state or condition of the system is only one factor to be considered, and not the immediate or direct one.

If the tartar deposit could be eliminated from the list of causes of the disease in question, the disease itself would practically disappear, so manifestly is it the prime cause of the disease and so little have other causes to do with it. Nine-tenths, if not ninety-nine-hundredths, of the cases that present themselves are due to it. Still there are other ones to be considered, and we will briefly allude to them, but only in a general way. They may be grouped together under the general heading of mechanical or chemical irritants, foreign to the oral cavity, and accidental in their presence. A plate unduly pressing on the neck of the tooth may be one

cause; a bristle from a tooth-brush or other foreign body lodged under the margin of the gum and pressing on the membrane, another; putrefying food allowed to remain in contact with the tooth and generating some poisonous ptomaines which gain lodgement at the gingival border, another; and so the list might be multiplied, but we will hasten on.

And now, for a moment, let us see if we cannot go a step farther back in seeking for the origin of the trouble. Is there not a first cause that should be considered one of equal, if not of greater, value than any of those we have already alluded to? I think there is. If I am right in my theory, the healthy mucous glands of the gingivæ do not secrete tartar. It is an abnormal secretion from glands in an unhealthy condition. Now, the question arises, What is it that destroys the healthy action of these glands and makes them a source of danger? If we can answer this question, we have gone a long way in the solution of our difficulty. And just here I hesitate somewhat, for I do not feel quite sure of my position, but I am anxious to place the thought before you in hopes, at least, of exciting criticism, and obtaining new light where I am so much in doubt.

I am strongly, then, of the opinion that a natural or acquired roughness of the neck of the tooth, under the free margin of the gum, is the main cause we are seeking. That such a roughness is far more common than is generally supposed I am fully convinced, and also that it is no forced conclusion to consider it a source of irritation to the open mouths of the glands in contact with it. It is quite possible likewise that just here the rôle of micro-organisms may be most important to consider, and that the poisonous ptomaines they produce, in growing, may have a most injurious effect. Unfortunately, direct experiment in this direction is most difficult to carry out, and we can only reason in an indirect way; but the field is a most inviting one for research and thought, and offers vast possibilities in the way of treatment. Of one thing I feel quite confident, and this I say from the light of many years' practice, that if the neck of the tooth, under the margin of the gum, is kept clean and polished, no tartar of any description will gain a lodgement upon it.

There is but one meaning to all that I have said so far in its relation to treatment. Taking the ground I do, that a local irritant is the prime cause of the trouble, and that constitutional conditions only indirectly modify or influence its character and duration, all treatment must be based directly in the line of removing this irri-

tant, and then in bringing the parts affected into a healthy normal state. The mode of procedure should be precisely analogous to that in surgery, which requires the removal of a splinter from the flesh or foreign body from a wound, as a preliminary to bringing about a healthy condition of the affected parts. Nothing more and nothing less is required.

First, then, in order of consideration, we have the mechanical removal of the tartar, or other exciting causes, by means of instruments specially devised for that purpose. In the use of instruments, though, the personal equation plays an important part, and instruments and methods will vary with the mental and physical peculiarities of each individual. All meet on common ground, though, in a few essentials, first among which I would say to be the complete removal of the tartar with as little injury to the soft parts as possible. For this purpose Dr. Cushing devised a set of instruments to be used on the push-principle, and Dr. Black strongly endorses them. My objection to them is twofold: First, they fail to reach all portions of the tooth to be operated on; and, second, their use endangers the soft parts; furthermore, the push motion, which separates the tartar from the root, does not remove it from the pocket, but leaves it there to be a further source of irritation. The force required to separate the tartar from the tooth, at times, is very considerable, and it is difficult to stop the instrument in time. Still, I would not be without them, or others of similar character, but I could not rely on them altogether. Those I prefer work on the principle of the hoe or scraper, and most of my work is done with them. The forms or shapes are almost numberless; and there is far more danger in not having variety enough than in having an excess. So much of success depends on readily reaching every portion of the coated tooth. To reach around and between roots -especially molar-requires many apparently eccentric shapes. Each operator, though, will be able to study them out for himself. Some of those I most commonly use I have brought with me, and will be happy to show to any of you.

But the steel, no matter how cunningly fashioned, will oftentimes fail to reach all parts, and we must seek other means to accomplish our ends; and no other is available that I know of except an acid, and this I constantly make use of. It takes very little acid to soften any form of tartar sufficiently so that it will wash off by a strong stream of water from a syringe or can be wiped off with a small pledget of cotton wrapped around a platinum point. It is a mistake to use the acid as liberally as many do. A few minims of an

eight- or ten-per-cent. solution of sulphuric acid, following the scraper or hoe, will generally suffice; but if more is required,—and it may be,—the applications should be twenty-four or forty-eight hours apart. I employ the chemically pure acid, and dilute it myself. The aromatic sulphuric acid I long since discarded. Instead of the acid, peroxide of hydrogen may be employed to good advantage, its solvent action on the tartar being nearly equal to the acid. In fact, just here it acts like an acid.

Cases will frequently present themselves where a single tooth will be badly affected, so much so as to be very loose and shaky, and yet a good portion of the root-membrane and socket be in a fairly healthy condition. Of course, the constant motion of the tooth tends to still further break up its attachments and hasten its loss. A simple device which I have frequently employed is here most serviceable. It is a device which, though I do not know of any other dentist using it, meets so directly the necessities of the



case, that I take it for granted that it is by no means new or peculiar to my practice. I refer to a brace so made as to make the neighboring firm teeth support and hold in place the loose one. The manner of making them will readily suggest itself to you all. They should be so constructed that the patient can easily remove them and put them in place. The fit should be a good one, and great care should be taken in its adaptation. A patient who has once

worn one of these braces will never, so long as the tooth remains in his head do without it,—so great is the comfort and confidence it gives them. Even where there is a vacant space next the loose tooth a satisfactory brace can be made, the vacant space being filled in in such a manner as to prevent the food crowding under it.

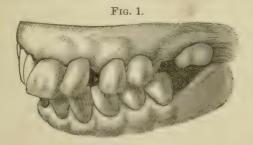
Sometimes it will happen that one root will be so badly affected—as in the case of molars—that it will be impossible to save it, and it will become a source of danger to the remaining sound ones. Amputation of the offending part is here clearly indicated, and should be resorted to without delay. For this purpose I generally use the engine, armed with a sharp fissure-burr. In this way it can easily be cut off, and without shock to the balance of the tooth.

Let me here draw your attention to the fact that when the disease attacks pulpless teeth, full success in treatment can seldom, or never, be hoped for, and, at the best, the actual loss of the tooth

can only be retarded. Sooner or later it is pretty sure to go. The reason is manifest on a little thought. The peridental membrane has a twofold source of vitality. The nerves and capillaries going to nourish and sustain it enter it from opposite directions,—from in and around the gingival border and from its apical end. Either source of supply is sufficient of itself to keep the membrane in a fairly healthy condition for a long time; but if both are affected or destroyed, the intervening membrane soon loses its vitality and becomes necrosed. There is seldom much pain accompanying this death of the peridentium. As it dies it seems to disintegrate, and dissolves out; and when the tooth is extracted, not a particle of the membrane will be found adherent to the root, but it will present a clean and polished appearance.

The age of the patient, the duration of the disease, and the general condition of the patient have to be all considered in treatment. If, from any cause the parts have lost a portion of their vitality, and do not respond quickly, or not at all, to treatment, then the case becomes more or less hopeless. As a rule, we can but assist nature in bringing about a cure, first by removing the exciting cause of the trouble, and then by such tonic applications as may bring new life to the tissues enfeebled by age or disease. All this portion of my subject I must beg leave to omit, so great is the diversity of opinion as to their relative values and their specific action. For myself, there are but few to which I attach any special value; and if nature, unaided, or assisted only by giving her a fair chance, cannot bring about the desired ends, I do not expect much help from local applications.

To illustrate one phase of pyorrhœa alveolaris, I have brought



casts of a case with me. In June, 1874, the teeth were perfectly regular in the mouth of a gentleman aged thirty-five or thirty-six, and also in a healthy condition. Soon after that, he felt the front teeth pressing tightly together; the three front teeth com-

menced to crowd each other; and in the autumn of the same year, and during the winter, the left central pushed against the right central, and finally commenced to overlap it. (See Fig. 1.) In the spring of 1875 the mouth was very much in the condition as that shown by Figure 2, which is a front view, and does not exaggerate

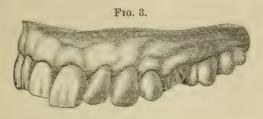
Fig. 2.

the deformity in the least. He came to me in 1887. The history of this case was precisely such as those described in my paper, in that he had been told that the trouble was constitutional, in the system; and nothing could be done; and so the disease was allowed to progress. On examination I found a pocket on the

lingual face of the right central, extending nearly to the apex of the root. On the left central the pocket had extended quite to the apex of the root, and had cut off the pulp where it entered the apical foramen, and the lateral was dead. A very careful examination, which I made by putting some cotton in the pocket two or three days in succession and pressing the gum back, enabled me to see a dark shade, indicating serumal tartar of the scaly character that I have described. The thickening of the membrane on the inner surface of the tooth had crowded it to the right and outward. If that pocket had been discovered in time, and the thin scale of serumal tartar had been removed, this deplorable condition of affairs never would have been brought about, and he would have had his teeth in a sound and healthy condition to-day.

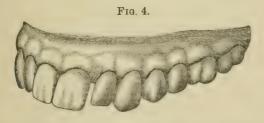
The treatment consisted, first, in the use of scalers to remove the tartar, followed by the application of peroxide of hydrogen. For a month or six weeks the teeth were treated once or twice a week. At the end of that time the teeth which were quite loose when I commenced the treatment—the lateral being very loose—were in a much firmer condition, showing that the tumefaction of the peridental membrane had been very much bettered. When I had succeeded in removing the tartar and quieting the inflammation, I commenced to move the tooth around to the left, and to pull it in. The next cast shows the condition of the mouth when the movement of this tooth was completed. (See Fig. 3.) You see it has been pushed out of the socket to one-eighth of an inch. For two months I tried, by various methods, to push it up in the jaw, but with very little success; and I was finally compelled to shorten it

by grinding off the cutting edge. I treated the lateral by removing the dead pulp and filling the pulp-chamber. The last cut (see Fig. 4) shows the condition of the teeth at the present time. This left central, which was at the commencement of the operation quite loose and out of place, is now almost as firm as the right central, and there is every indication that the disease is completely cured.



He is now wearing a stay-plate, as in an ordinary case. I have here a bottle of teeth, showing all the varieties of serumal tartar that I spoke of. Notice, especially, the two bicuspids, showing the scaly tartar. The teeth look as though they had a slight coating of varnish.

This case merely illustrates the effect of serumal tartar, of the thin and scaly character, very beautifully. But, after all is said and done, it is not more instructive than others that are occurring



constantly in practice, but it is more showy; and that is the reason, more than any other, that I have brought it here. If a sound and firm tooth in the mouth of a man of thirty-six years can be pushed completely out of its place inside of eight months by swelling of the peridental membrane, induced by tartar, it shows the necessity of an early and correct diagnosis and prompt and thorough treatment. There is no new deposit of bone whatever. The parts around the tooth have assumed a normal condition, and the pocket remains as it was when I commenced.

LIGHT TO THE GENTILES.1

BY W. S. ELLIOTT, M.D., D.D.S., M.D.S.

ONE-THIRD of a century of active devotion to our work ought surely to have evolved something worthy of record; and so it has, perhaps; but it is difficult to concentrate the nebulæ of diffusive experience into anything like a planet of tangible proportions. Each day's work is suggestive; and it is thereby that we move forward, forcing the light of accruing knowledge into the void of darkness, of ignorance, and inexperience. Moving, we would

"Gather up the sunshine bars
That fall around like jewelled stars."

This congregated mass of intelligence is but the effulgence of the noon-day, limiting the shadows of interference to a minimum degree of extension; and that the gentile mind may not continually repose within the shade of indifferent attainment is this Society's mission.

Dentistry is said to be a science of demonstration, while medicine is more or less empirical. But the science that leads to success in practice in either department is rational in its working, and not the outcome of mere chance effort.

In giving consideration to this subject, opinions must give way to proofs, and conclusions follow only on substantial scientific premises. Pure assumption is the dark lantern that fails to enlighten,—scientific penetration alone opens the understanding to a full recognition of true genetic evolution. In studying the successive steps of progression, we would postulate a Power which is parent of the forces, and which becomes the instrument or medium of consummation of purpose. Step by step, as sequence and consequence, should observation be governed. It is thus that metamorphoses are distinguished and knowledge gained. Some phases of accepted knowledge will prove only inferential; but when inference in any given case has developed to positive assurance, under the usual rendering of the law, then may we safely dwell upon the undefined

¹ Read before the New Jersey State Dental Society, at Asbury Park, July 18, 1889.

in the series as true to satisfaction. There are apparently missing links in the chain of development in every process of natural law; and it is safe to assume that the gaps will in due time be filled by tangible realities as well as by the possibilities of inference.

Knowing the law, we must follow its tendencies, despite seeming variability; thus may the energies of aggressive inquiry be conserved to timely and effective results. This is the incentive to persistency in every line of research, and the reward is as inevitable as the law is true to its fulfilment.

Diagnostic skill depends upon an habitual observation of the deflections from normal processes, and the latter can be fully comprehended only by the following of the serial steps of "togetherness" under the rule of typical presentment. Change, which is the "immortal delight of creation," and which is the good angel of our being, resides primarily in the ultimate atom. Here is stored the energies of developmental entity, which, through differentiated environment, are set free to the accomplishment of purpose. How important is it, then, to know the value of endowment bestowed upon these, and the possibilities of which they are possessed. A perfect environment and a perfect conformity to that environment is the consummation of perfect being.

We build, sometimes, better than we know; and past efforts have shown how successfully we battled with microbes by the use of the older antiseptic agents, when the enemy was unseen and unestimated. The rule of aseptic treatment, now so generally adopted, is the outcome of scientific research and provings; and all former attempts in this direction become the more rational as we recognize the possibilities of contagion.

To speak now more especially of features of actual practice, you will bear with me if I should be diffusive in my references.

First, of the antiseptic agents of later discovery. In the hydrocarbon group of chemical compounds do we find the most efficient ones, and of these, my choice, under most conditions, is the camphophenique of the Phenique Chemical Company, of St. Louis. It is antiseptic in a high degree, and meets most satisfactorily the large majority of cases of daily practice. It is non-irritant, and not unpleasant to taste or smell. It is set forth as a definite chemical compound, having for its formula $C_8H_{11}O$. But this, I think, is not strictly true. My impression is that it is a mixture of two distinct molecules of camphor and carbolic acid. The formulæ will bear me out in this assertion.

Carbolic acid is represented by C₆H₅(OII). Camphor,—C₁₀H₁₆O.

The chemist has merely added these numbers together and reduced the product to its lowest denomination, thus:

$$\frac{\substack{\text{C}_{6} \text{ H}_{5} \text{ (OH)} \\ \text{C}_{10} \text{H}_{16} \text{ O}}}{2 \underline{\text{)} \text{C}_{16} \text{H}_{22} \text{ O}_{2}}}{\text{C}_{8} \text{ H}_{11} \text{ O}}$$

No interchange of atoms can take place until there is a stronger affinity set up by the presence of other atoms of other broken molecules while in their nascent state. It will not be claimed, perhaps, by the manufacturers that the formula as given is anything more than an empirical one, since the exact changes, which take place when certain crystalloid substances of the camphor group are brought into contact with the halogen derivatives, are not well understood, although their mutual liquefaction has long been known. The field is new and comparatively uninvestigated.

But I will not detain you by these technicalities, though the study of them is interesting, and of more importance than some I know of are willing to concede.

At a late meeting of the Massachusetts Dental Society, a paper was read by a Southern gentleman, extolling sterilized sponge as a dressing for exposed pulps. He cited numerous instances of complete success during a period of two or three years. The showing was of such a nature as demanded a philosophical statement of the process of repair, and a request was made for an exposition of the reasons why sponge was selected in preference to other materials which had heretofore been used for the purpose. No satisfactory reply was made, and only a general statement that the sponge prevented mechanical pressure upon the pulp when the cavity was filled; and that it induced a deposit of secondary dentine at the point of exposure. It will be profitable, perhaps, if we inquire into this subject a little, and ask if such practice is in harmony with the law of repair and reproduction. Sterilized sponge has been used in the treatment of lesions of the soft tissues with considerable success; and it was a curious phenomenon that the sponge thus used was found to have been taken up by integration and to have become a part of the new growth. It is evident enough that the porosity of the material favored the retention of a protoplasmic mass, which is held in a kindly way to encourage propagation. Its disappearance called for an explanation, which I have never seen published; nor would I presume to assert the whole truth in what I would advance, but merely infer that the chemical elements of the sponge were of a nature quite in harmony with physiological requirements and such as presented pabulum suitable for nourishment of the tissues. The components of sponge are gelatine, albumen, carbonate of lime, chloride of soda, magnesia, silica, iron, sulphur, phosphorus, and traces of iodine and bromine. All these substances stand in favorable relation to the constituents of the blood, and, through the chemico-vital energy, are appropriated the same as if presented to the parts through the blood circulation.

Now, returning to the treatment of the dental pulp, it does not seem probable that in this the sponge would play the same rôle, since it could not become saturated with any effusion from the pulp that would be organizable. At best, there would be only a slight moisture, and the sponge could take no part in the process of repair. It is the function of the globular bodies to lay down the lime salts, and the territory of repair is within the walls of the pulp-cavity rather than in the cavity of decay, conditions unlike the flesh lesions just mentioned.

If an exposed pulp is conserved by such a dressing, it is due, more likely, to aseptic conditions rather than to the sponge per se.

I have referred incidentally to the waste of energy incurred through the want of the knowledge of basal principles, and how such energy can be economized by a direct application of those principles when understood.

Therapeutics become the means to the end when combating disease, and in the department of mechanics every appliance which will help to direct this energy to the purpose sought should be available; and perhaps the most appreciable instrument of modern practice is the dental engine. Here I desire to make a point which, it seems to me, has been grossly overlooked, and you will excuse me for the reference. Seventeen years ago I had the pleasure of introducing to the profession an engine known as the Suspension. To-day, I am able to declare—as proven by those who have had it in constant use since that time-that it fully sustains the claims then made for it. I apprehend that its merits are not fully appreciated, for the reason that it has not been presented to the profession with as much push as has other inventions. With an independent motive-power-water or electricity-it becomes the ne plus ultra of all implements. There is in it a vast latitude and freedom of motion; no back lash; no slack bands; nothing to encumber floor-room; no necessity for a great amount of machinery to adjust and keep in repair. In referring to this instrument I have no interest, other than to remind you of the best of all.

Again, allow me to touch upon an item which you may think of but little moment, yet which embraces problems of interest and importance, when considered in a general way. I refer to the "setting" or consolidation of amalgam. I have asked frequently for the reasons why amalgam, freshly reduced from the ingot, should "set" quicker than when the filings were a few weeks or months old. You will admit the premises. The only answer obtained is that oxidation prevents quick setting; the grains of metal become oxidized through exposure, and crystallization is thereby checked. This is not satisfactory, since washing the filings free from the oxide does not favor the process of hardening. To my mind, the true answer is this: The friction of the file or cutter imparts to the granules a magnetic polarity which they are capable of holding for a limited time, but which energy is dissipated after a few weeks. Crystallization is an exhibition of kinetic force in perfect correlation with the stasis of magnetism, and the process is quickened by the transfer of the stored energy of the one mode to that of the other. Crystallization is checked in proportion as the magnetic energy is dissipated.

I do not bring these items forward as of particular importance in themselves, only as instances of opportunity that occur in practice when valuable information may be obtained by a habit or disposition to know the inwardness of things seen; and without holding you longer, you will accept the offer of my desire to urge directness of procedure in chemistry, therapeutics, and mechanics by as complete an understanding of each as may be obtained through a study of the laws which pervade and control all the operations of nature.

It is thus that the light of knowledge will penetrate the dark places and the subtile mysteries of being made to develop into substantial correspondence with observed phenomena.

SENSATION.1

BY GEORGE W. WHITEFIELD, M.D., D.D.S., CHICAGO.

This is a difficult and complex subject to treat, and one that from its very nature compels me to look to standard authorities before mapping out my course. The subject may be dry, but still, to me, it has a subtle charm, pertaining, as it does, to the fundamental principle of learning. To understand the causation of sensation is to possess the key to the study of human nature,—almost the acme of human knowledge.

As an intelligent man reads and understands what is written, so a wise man reads the unwritten language of human thought expressed in pose, face, gesture, and action.

First of all, let us consider the lowest form of nerve-system that we possess knowledge of,—the centipede's. The creature is possessed of a great number of little brains, nerve-centres or ganglia, one to each of its many joints, to preside over each pair of legs. The action is like this: As each pair of legs touch is the ground, a sensory impulse is transmitted by the afferent nerves to the reflex centres, there to be so modified that it causes a motor impulse to be propagated along the motor-nerves to the muscles, causing them to act. That the reflex centres can act independently of a higher centre, or the true brain of the creature, can be illustrated by snipping off its head while in motion. It will continue to run until it meets an obstacle.

Animal life could not exist without the part played by reflex nerve-action. This is just as true of man as of the lower forms of life. In man the spinal cord may be considered as a downward prolongation of the brain, with which it is most intimately connected. It is composed of two parts,—an outer white portion, and an inner one of gray matter. The white portion is composed of bundles of

¹ Read before the Chicago Dental Club, September 23, 1889.

² Three years ago, when lecturing on pathology before dental students, I gave some lectures on sensation. From these lectures I have prepared the first part of this paper. At this late date I cannot give my authorities. I am especially indebted to the author of a pamphlet which I read at that time, but cannot recall the author's name. From it I gained much of the substructure of this paper.

nerve-fibres, for the transmission of nervous impulse in both directions. The gray portion is composed of highly-endowed nerve-cells, constituting ganglia or nerve-centres, which, under stimuli, have the power of transforming sensory into motor impulses. It will not be necessary for me to describe the anatomy of the spinal cord, but I will speak of the elements co-operating in the production of every physiological act,—the sensory nerves to convey towards the centre the impulse set in motion by external causes, the nerve-centre excited to active change by the stimulus received, and the motor or afferent nerves to transmit the energy transformed in the nerve-centres to the organ which in turn is excited to action.

The plan of nerve-action is simple if you comprehend these principles. Nerve-action can be compared to pulses, throbs, or explosions of nervous energy, according to the degree of action.

There is, arising under sensory stimulus, a pulse of excitement, and a discharge of energy, and then a subsidence followed by a never-ending quiescence, unless the centre is again stimulated from some source external to itself.

Please bear this in mind: there is first the pulse of excitement carried to the nerve-centre, followed by the explosion of nervous energy at the nerve-centre. As there can be no explosion of nervous energy without a prior sensory impulse from without, carried to the nerve-centre by the sensory or afferent nerves, the centres are not capable of self-stimulation. Thus you see what an important factor in animal life is sensation. In fact, the term sentient being is often employed as synonymous with animal life.

We have been speaking of sensory impulses. We will now consider what constitutes conscious sensation. Let me call your attention to the fact that anatomically the brain is a prolongation upward of the spinal cord. In other words, the brain is the enormously expanded portion of the cord, with its centre turned out. The cord in man is anatomically continuous, yet it is just as much the seat of reflex action as though it was, as in the centipede, composed of numerous anatomical separated nerve-cells or ganglia. Its continuity of structure facilitates the rapid transmission of sensation to and from itself, or to the higher nerve-centre,—the central organ of the whole nervous system. It is with the brain as a central nerve-organ, a congeries of differentiated and highly specialized nerve-centres,—a nerve-centre of nerve-centres,—that we have more especially to deal.

I have used the simple forms of reflex nerve-action to render more clear the phenomena of all nerve-action,—the pulse, throb, or explosions of energy, according to the amount of stimulation in the nerve-centres; the discharge of motor impulse to excite into action the organ to which it is sent.

An understanding of this will explain what takes place in the brain itself; for the brain is a nerve-centre,—with extraordinary endowments and of immense size, it is true, but it is a nerve-centre just the same. It acts only under stimuli, just like any other nerve-centre, even those of the centipede, but with this difference: all subordinate nerve-centres receive their stimulus from without, by the afferent or sensory nerves, unaided by the power of self-stimulation; not so the brain, for it is capable of self-stimulation,—that is, it receives stimuli from the direction of the external media through the five senses, and also from the direction of that unknown and unknowable something which we term the mind. But whether the stimulation comes by way of the senses or is self-generated matters not: the important fact remains that the effect produced is identical.

For instance, the thought of luscious fruit recalls a sensation of the odor and taste varying only in degree, not in kind, and the salivary glands are excited to activity. A sensory impulse, no matter what produces it, provided it originates outside of the sensorium, is first transmitted to its own nerve-centre or centres on its way to the sensorium, producing everywhere its appropriate reflexes, until finally it reaches the great nerve-centre, the brain, and we become conscious of the impulse by the throb or pulse of action, which has been produced in the unstable substance of the nerve-cells, just as in the minor reflex centres of the cord.

On the other hand, the changes are identical with the changes that take place when the stimulus is centrally initiated. Thus we see the brain is constantly subjected to these two diverse sources of stimulation,—viz., from the periphery by way of the senses, or from the mind.

A sensory impulse becomes a cognition in two ways,—by repetition and comparison, by the relation of differences. We are incapable of perceiving anything but by differences. It may be the difference of kind, degree, or time, but there must be a difference in one or more of these ways, or we fail to feel.

Reports of Society Meetings.

PENNSYLVANIA STATE DENTAL SOCIETY.—(Concluded.)

Wednesday, July 31.—Afternoon Session.

DISCUSSION ON DR. ROBERTS'S PAPER.

Dr. Beck.—I would like to ask the essayist regarding the resistance machine, White's manufacture, whether it is necessary to use three lamps of sixteen candle-power to bring down the power to sufficient strength to run the mallet?

Dr. Roberts.—One lamp of sixteen candle-power takes about seven-tenths of one ampère. Three lamps would represent about two ampères of current. The current must be reduced that much; otherwise it will burn the mallet out. Then we have also to reduce the voltage of the current, which is done by shunting part of the current through the mallet, the resistance of the mallet being a great deal more than the rest of the circuit for which it acts as a shunt. They use a very small part of the current that goes through. I think a better arrangement could be made.

Dr. Beck.—Dr. Starr has demonstrated it to me, and it occurred to my mind that in using three lamps of sixteen candle-power it used a vast amount of power to reduce the amount down to drive the mallet. That power on the mallet would burn the mallet out, and I asked him the same question,—Whether two lamps of the same capacity would not give the same results?

Dr. Roberts.—He uses the lamp because it is the cheapest kind of resistance. He claims to use the heat that would be wasted in any other way, which I think is good. Another way of using the mallet on the incandescent current, I think, would be serviceable and a better arrangement. It is to make a motor, winding it with two independent coils on the armature, one with a few turns of wire and the other with many. The motor can be made so that it will require less than one ampère, or the current that goes through one lamp, to run it. The armature of the motor would have a commutator at both ends, one for each of its independent coils. The mallet would be connected to the commutator attached to the coil having a few turns of wire, and the motor placed in the main

circuit. When the motor is run, there would be generated a current in the coils connected with the mallet, the potential of which would be in the same proportion to the main circuit as the number of turns of wire in the mallet coils are to the number of turns in the motor coils. If there were one hundred turns in the motor, and ten turns in the mallet coils, there would be only one-tenth the pressure through the mallet that there would be in the main circuit, and in that way you can get the potential down to almost any amount. The same motor could also be used to drive the engine, and when you were not using the mallet the brushes would simply be raised so as not to touch the commutator.

Dr. Beck.—I went to our electrical company, who runs the two kinds of power, arc and incandescent, and I saw them putting in dynamos for various kinds of power, and it occurred to me that they might make a resistance box so as to run the mallet by taking the power from incandescent wires. They said they could not form it in that way,—that they would be afraid to introduce it to drive so delicate an instrument as the mallet. All of you who run an electric mallet, and who use a Bunsen battery, know what a nuisance it is to charge the battery. I use four cells, and sometimes a fifth, but I have to alternate these cells. Mostly, if I have a large amount of heavy work, I have to renew two cells alternately during the week. If we can get power from the incandescent lamp which will do away with all this changing of cells, it will be an important advance.

Dr. Faught.—I am glad Dr. Beck spoke of the battery, also the mention he makes of the hot-air apparatus. It is a very good one. To those who are compelled to use a battery I would say that from personal experience there is no better battery than the Partz. It is a sulpho-chromate battery. With it I run my mallet; also my lamp for heating purposes, and the very best average is only once in three months does it require cleaning, when you have only to pour out the fluid, wash it out with water, and fill it up again. There are no dirty acids or salts deposited anywhere about the parts. It is easily filled, and acts immediately. The fluid is made from a patent salt. I can do all the work I want to, and in about three months, if the battery gets weak, I add about a spoonful more salt, and it will be sufficient for several weeks more.

While on the subject and uses of electricity, I want to mention a little instrument of my own invention that will shortly be put on the market. It is to be used for filling teeth with gutta-percha. It consists of a handle, to which points adapted to filling any cavity

can be attached. These points can be heated to any desired temperature by means of electricity passed through the handle to a resistance material situated at the base of the point.

Dr. Beck.—Could not an instrument of this kind be made for annealing gold, instead of the use of the lamp?

Dr. Roberts.—It would depend upon the weight of the gold how much current would be required. That would be regulated by a resistance coil. The gold would simply be placed on the conductors to heat the full length, or mica or some such substance could be heated, by a current passing on one side of it, to any degree, and the gold laid upon the other side to be annealed. Then it would make no difference how heavy the gold was.

Dr. Magill.—There was another question: What have you to say in regard to the danger?

Dr. Roberts.—I think the danger is more imaginary than real. The day before coming here I placed my hand on two live wires. You cannot ground the current of the incandescent wire, because there is not enough voltage to overcome the resistance. The arclight wire would be very dangerous. The danger is through the ground, and you cannot take hold of an arc-light wire. With the incandescent light you can burn yourself to a blister, and that is all you can do without a special effort, and the patient is not going to sit quiet long enough to be burned.

Dr. Magill.—When both instruments are in use in the same vicinity, can there be a possibility of transfer or interchange of arc and incandescent current?

Dr. Roberts.—It is so arranged that only a given amount of current can pass through. A wire of this kind will seldom carry over two ampères of current. It will burn or melt, and break the circuit.

Dr. Green.—Do I understand that, in taking four cells, the power of the battery is represented by the two weak, or the two strong cells?

Dr. Roberts.—There would be a balance or average between the stronger and weaker cells. Where the cells are arranged in series, the carbon in one to the zinc in the next, you get the greatest pressure. If you connect all your carbons together you have simply one large cell. If the resistance of the mallet is such that enough current will run through to run the mallet, that would be the most economical arrangement you could get; but the mallet is not wound that way, for the resistance there is so great that there must be more than two volts to get it to run well.

Dr. Green.—I think we ought to be very grateful to Dr. Roberts for giving us such a distinct definition of the various terms used at the present day. We may take this entire assembly, and not more than a few of us can define the terms. The manner in which he has brought the subject before us, I think, is deserving of a great deal of attention. I now feel that light has been thrown upon much that has been dark to me in the proper understanding of the terms used by electricians. Now that electricity is to be used for executions, and is being introduced in various places as a means of power, it is very important to look the matter squarely in the face.

He tells us that out of all the coal we burn in an engine there is not more than ten or twenty per cent. converted into energy. Think of the amount of coal we are throwing away,—getting only about six per cent. of service out of the entire body. It is natural for men to look towards some other means for getting power, and the doctor has very nicely presented the subject as to the advantages of the electrical power over some others now in use.

Dr. Roberts.—Regarding executions, I do not believe that criminals will ever be executed by electricity. It can be, but will not be. There is too much opposition to it; and another thing, those men who manufacture generators, or machines to give the incandescent current without using transformers, say, "Take my dynamo and execute with it if you can." On the other hand, the arc men are sending men on there to add their testimony that it is not safe without ascertaining what the resistance is. It is possible to make such connections with street wires—the incandescent—that you can only get in your office a certain number of volts. They will not do it, because it is out of their line. If we have a wire split and brought together again at the other end, either wire could be called a shunt to the other,-it divides and comes together again. Any current that leaves the dynamo must come back to it in some way. The S. S. White Company claim to reduce the potential by shunting most of the current around the mallet. I should suppose that the resistance of the mallet and the shunt are in the same proportion to each other as the voltage they want through the mallet is to the voltage of the main circuit.

Dr. Beck.—I do not know whether there is any difference in the force, but I want to say this regarding this point. We have two electrical companies in our place,—one incandescent, one are. Then we have a street railway which runs an electric ear. By some means a locomotive passing along broke the overhead wire over the car which makes the connection, and before it could be

taken up a horse came along, and as soon as he put his foot on the wire he dropped dead. Another peculiar occurrence was that in a heavy thunder-storm a dynamo ceased to work, and upon examination they found a bolt had struck a wire somewhere. The dynamo was taken apart to ascertain the cause of its stopping. I understand the dynamo afterwards had to be recharged.

Dr. Roberts.—The wire will only carry a definite amount of current. The bolt of lightning which struck the wires sent the current through the dynamo in amount greater than the dynamo would earry. It burnt out the insulation.

Dr. Beck.—In ascending high hills there is no difference in the momentum of the cars. Conductors tell me that when these cars are heavily loaded they find a slight difference in the velocity of the car, but the car goes up the hill the same as on a level.

Dr. Faught.—While the subject of the car is under discussion, I think if you draw your circuit from the same wire that manages these cars there will be no satisfaction to a dentist, for it will depend upon where the cars are for your light. Then the power will not be regular, and it will also depend on the number of cars on the circuit.

Dr. Roberts.—The current they use for running electric cars runs away up from two hundred and twenty to five hundred volts. I think it is possible to get a regulation for the motor to run the engine in a manner so that when you are using a disk and want slow speed, you can get slow speed with the power. With the arrangements they generally use now, when you get slow speed there is no power. It is theoretically possible to make a motor so that when you are running it slowly you will get more power than when running it faster. Motors are not made in that way, because there is no demand for them, but if I can I want to perfect it.

Dr. Klump.—Is the difference in capacity due to the difference in resistance or the winding of the wire?

Dr. Roberts.—The difference in capacity is due to the resistance, the winding, and the counter-electromotive force generated by the motor.

Subject passed.

NEW JERSEY STATE DENTAL SOCIETY .- (Continued.)

DISCUSSION OF DR. GEORGE S. ALLAN'S PAPER ON "PYORRHŒA ALVEOLARIS.

Dr. James Truman.—Mr. Chairman, I am placed in rather an embarrassing position, in having to talk to an audience composed largely of gentlemen who did not hear Dr. Allan's essay this morning, and many of whom probably have come to listen to the paper that will succeed my remarks; however, I will endeavor to condense, as much as possible, what I have to say in answer to Dr. Allan's paper.

The first point that seemed to me to require attention was his statement that the investigations of Dr. Black, of Illinois, have given us all that we really know in regard to pyorrhœa alveolaris. Now, as this question has occupied the professional mind for the last twenty or twenty-five years, I do not think the statement can be wholly relied upon as true. No doubt, Dr. Allan thinks it is true. I am not willing to count myself second to any one in appreciation of Dr. Black's histological work; but long preceding his investigations, I think, the profession quite thoroughly understood the nature of this pathological condition. Twenty years ago I spent a great deal of time in the investigation of this subject, following the lead of the French workers, especially Dr. Magitot; but the results of treatment were not satisfactory.

Dr. Allan stated this morning that the loss of teeth from pyorrhea alveolaris was greater, probably, than from all other causes combined, if I understood him correctly. That certainly is a mistake. It depends largely upon his definition of pyorrhœa alveolaris. Allowing the largest latitude for that definition, taking in all the senile teeth, and including all those that have suffered absorption through the action of tartar, as well as those that can be justly said to be destroyed by this disease, and we would not have a number that would at all compare, in my judgment, with the number destroyed by caries. But has he any right to take in senile teeth, and the teeth that have been destroyed by tartar? I contend that those teeth that have been injured by deposits, or lost in old age, where absorption has taken place, cannot properly be included; their loss is due to an entirely different action. Also those teeth that have been lost or loosened by salivation are, in my view, to be thrown out entirely; and we should then include only those

that are affected by the pathological condition which we term pyorrhœa alveolaris.

The essayist took the position, if I understood him, that the presence of pus does not represent the disease. Now, what is pus? If I understand at all the origin of pus, and perhaps I do not, it is this: irritation precedes what we call inflammation, and inflammation produces what we term pus, from two processes: first, emigration of the so-called white blood-corpuscles; and, secondly, the breaking down of tissue and the retrogade metamorphosis of the tissue to its original protoplasmic elements. Is it possible to have inflammation without one or both of these processes going on? I certainly contend that it is not. The moment you have irritation you have an enlargement of the blood-vessels and a congested condition, and when that occurs, you have the emigration of the white blood-corpuscles, and eventually a breaking down of the tissue and the retrograde metamorphosis that I spoke of. Can we have inflammation, such as we understand by pyorrhea, without pus? Certainly it does not appear to me to be so.

The essayist further stated that the name was a misnomer. That is, in one sense, true. But some words change their meaning. All words represent an idea, and that idea may change in the course of time. When the French writers named this disease pyorrhœa alveolaris, it meant to them precisely what the term conveyed,—pus originating from the alveolus, the bone surrounding the teeth. In the course of time that idea has changed, but the name remains; and I think it is well to continue it. If Dr. Allan had been a teacher as long as I have, probably he would understand how difficult it is to go before a class of young men and talk on subjects, and have to enter into a definition of the different terms, which have been given by various individuals when they had found those that represented their ideas, little thinking that in the course of time these will change, and their terms may no longer represent these pathological conditions. As a matter of fact, is this name entirely wrong? Dr. Black, whose work in this direction we all fully appreciate, has shown us most clearly that the periosteum is made up of inelastic fibers, that extend from the cement on the one hand to the bone on the other without break; and if inflammation occurs in the periosteum, it is necessarily carried to the cement on the one side and to the bone on the other. Therefore is it wrong to call this disease pyorrhea alveolaris? I do not think it is. Nine times out of ten, the essayist stated, tartar was the cause of the disease. Now, if nine times out of ten tartar is the cause of this

disease, we ought to have it in all cases where tartar is found. He acknowledged that ordinary salivary calculus was not the cause of this disease; but the tartar which he found upon the teeth or roots he called serumal tartar. He has taken up the old, old song of serumal tartar, and affirms dogmatically that it is serumal tartar. I have yet to learn of a single investigation that has been made to demonstrate the existence of this characteristic tartar. What is it? If I understand it, it means a calcareous deposit from the serum of the blood. We all know very well that there is scarcely an organ in the body that may not receive such deposits; but we have no evidence that this serumal tartar, so-called, comes from the serum of the blood. May it not come from pus? because pus can deposit calcareous particles as well as any fluid of the blood. As long as we do not know that it does come from the serum of the blood we have as much right to affirm—as this gentleman has to assume the contrary—that it is derived, as ordinary tartar, from the saliva.

Now, what is the genesis or origin of this pathological condition? Does it originate from tartar? Not if I understand it. Does it originate from the roughness that Dr. Allan spoke of, at the gingival border of the teeth? Possibly; but where does that roughness come from? When you take a patient in hand, and that patient states to you that in the morning when he brushes his teeth the blood will ooze from the gum, "that his teeth bleed," you know, and we all know, what that condition is. Here and there a tooth will present a bright red line at the border-line of the gum. The moment that is touched blood will ooze from it, by the disturbance of the capillaries at that point. That is the beginning. And if you take it in hand at that stage you can stop pyorrhea alveolaris. It has nothing to do with tartar. It may come from constitutional disturbances; it may come from some form of nephritis, or a long siege of sickness. What then follows necessarily after this? Immediately succeeding we have a development of microorganic life. That I demonstrated twenty years ago. On examination of these cases I found large quantities of bacteria throughout the broken-down tissue. I soon learned that they had something to do, although I did not then appreciate the full extent of their action, with all these inflammatory conditions; and you dentists, every one of you, can and do make those conditions in the mouths of your patients by careless work. When you place a rubber dam, or a clamp, or ligatures upon teeth, you produce irritation, and the patient will complain. You take off the instrument, and you allow the patient to go away without any treatment whatever. In fortyeight hours there will be a development of micro-organisms, and pain will result, and irritation at the neck of the tooth; and if it is not stopped at that time, it may go on until this pathological condition which we call pyorrhœa alveolaris appears.

What is the treatment? First, I hold that no dentist should put a rubber dam in the mouth, or a clamp on the teeth, or do anything of that kind that is liable to raise inflammation at the necks of the teeth, without applying an antiseptic. For this purpose I know nothing better than sulphate of quinia, mixed into a paste,—not because it is the best germicide, but because it is more lasting than other agents.

This disease has its origin in inflammation of the periosteum, or pericementum, of the roots of the teeth. There is no question about that. I am satisfied, by the investigations of others, that I have always been right in that respect, and I have been teaching it for many years. It naturally follows, therefore, that if we are to treat the teeth properly we must direct our attention to the microorganic life first, and not to the tartar, which is secondary. Has Dr. Allan ever found his so-called tartar below the line of healthy pericementum? I cannot say that I ever did. The tartar comes in afterwards; first, disturbance of the pericementum, then the deposit of tartar. Remove that tartar and what is the result? Always a necrosed tissue. I have never succeeded in building up the periosteum beyond that line. Dr. Atkinson asserts that he can build the periosteum up to the gingival border of a tooth. I never have been able to do it. If there is tartar there, it should be removed, but it is not the original cause of the trouble; and Dr. Allan himself says that the roots of teeth that have been lost through this pathological condition are shiny and without periosteum. If that is the case, how is he going to do anything with it? The use of mechanical instruments should be secondary. I have treated successfully many cases of pyorrhea alveolaris, and rarely have I used an instrument. I do not find so much of that tartar as some seem to do. I find it on senile teeth; but that is not pyorrhea. I do not think any man here ever saw a case of pyorrhœa alveolaris on the lingual surface of the inferior central incisors. You find it on the anterior surfaces but not on the posterior; because the tartar is there to protect the lingual surface. Where tartar is there cannot arise-does not arise -this pathological condition, in my judgment.

The treatment is necessarily very much in accordance with that stated by Dr. Allan. I do not differ with him materially upon the subject generally. The points of variance I have endeavored to

bring before you. In the treatment it is necessary first to remove any foreign body that may be present, whether food or other deposits; then inject into the pocket peroxide of hydrogen. I follow that up with sulphuric acid. I was very glad to find that Dr. Allan had been using altogether the commercial sulphuric acid. I long ago abandoned the use of aromatic sulphuric acid, as not being adapted to our purpose. I think we owe the introduction of this agent to Dr. Atkinson. I have used it for many years in this particular work. Magitot recommended chromic acid. I never had any satisfaction in its use, nor any of those more powerful agents. I use the ordinary commercial sulphuric acid, but stronger than Dr. Allan uses it; a twenty-five-per-cent. solution, and sometimes even stronger than that; but I do not allow it to remain on long. I apply it with a sharp stick around the teeth. It, of course, turns the parts of a dark color. I allow it to remain two or three minutes; not more; just sufficient to burn out the dead tissue; then immediately apply bicarbonate of soda, which brings away every portion of the dead matter. After a little time has elapsed I wash it out with warm water; then apply sulphate of quinia. I have used this for years successfully. If you want to know the philosophy of it, look into the materia medica books, and you will find it described. The sulphate of quinia will remain there longer than any other antiseptic that I know of. If the pain returns in the course of a few days, I would, of course, repeat the sulphuric acid treatment, and after that continue the antiseptic treatment. Then, after the parts have become perfectly healthy, you must use an antiseptic wash to keep them in proper condition. If the pocket remains, there will be a return of the disease, in spite of all your efforts, if you do not take necessary precautions to obliterate it.

This mode of treatment is not original with me, except the bicarbonate of soda and quinia. I have used these for several years with the most decided success and the greatest satisfaction.

Dr. Sudduth.—This is a subject of great interest to the profession, and, if time permitted, I would like to go into it fully. I can heartily second what Dr. Truman has said regarding the relation of serumal tartar to this disease, and the deposit found on the teeth being secondary to the disease. The initial phase of the disease we do not know. No man has ever been able to tell what is the cause of pyorrhæa alveolaris. There is a catarrhal process; but what causes that catarrhal process to be set up has not been as yet solved. The deposit on the roots of the teeth is evidently a result of the catarrhal process. First there is irritation; then follow micro-

organisms; and they in turn become a source of irritation, but their direct connection with the disease has never been determined.

The treatment that has been advocated—the use of aromatic sulphuric acid or commercial sulphuric acid—is good; but you should follow it up with some stimulating antiseptic. About a year ago I presented to the profession some tablets of silico-fluoride of soda, made after a formula of Mulford, of Philadelphia. It is coming to be used in surgical practice, especially in ophthalmic cases, and has almost taken the place of boric acid in operations on the eye. It is not poisonous. I mentioned this remedy before the Pennsylvania State Society a year ago last June. No one has taken it up, or, so far as I know, said anything about it. The object in bringing these remedies before the profession is to have them tested. This summer I have again distributed samples to members of the profession, hoping they would try them and report the results of their use in this treatment.

Dr. Rhein.-Mr. President, I want to speak of one point in Dr. Allan's paper; that is, the opinion he expresses that pyorrhœa alveolaris, as we see it, is never due to any constitutional affection, as I understand him. The very worst cases of pyorrhœa that have ever come under my notice have been cases absolutely devoid of tartar, either of the so-called serumal kind or any other. Speaking after considerable experience in the treatment of the disease, the opinion that I have come to hold is that where pyorrhea is the result of some old constitutional trouble, as we frequently find it,—and we frequently find it in those chronic forms, some cases running for ten or fifteen years,—it results from some febrile disturbance, or some great disorder of the general system, which was cured, but left that condition of pyorrhea, which became chronic. Those cases look the worst when they come to us; but they are always curable; and it is cases of this kind that have misled a large number of the profession to the belief that every case of pyorrhœa is curable. There are certain cases, which, to my mind, are not curable; at least I should be delighted to see them cured by any one. The great difficulty in coming to a determination in regard to this matter is that the majority of us make no effort at a differential diagnosis when we see a case for the first time. Our first duty should be to assure ourselves that the patient has existing in his body no pathological condition; and to that end I always insist upon making a very careful examination of every vital organ, including a thorough examination of the urine. The urine is really one of the most important means by which we can come to an opinion on the subject.

But no conclusion should be arrived at from a single examination; it should be taken at different intervals. By an examination of that kind we may find, in people who are subject to pyorrhea and who are advanced in life, a sluggishness of the circulatory system which is sufficient to produce this result. In numerous cases where an examination has shown symptoms of Bright's disease, or phthisis, I have found that all the treatment and hygienic care that could be given would not prevent the disease returning in certain cases that were beyond medical treatment, as acknowledged by the best professional men that we have in New York City. I will give a practical case, showing that the disease is due to some pathological condition existing at the time.

A few months ago a gentleman came to me from out of town; his mouth was in very bad condition; pressure upon any tooth would cause a large exudation of pus; the gum around the gingival margins was whitened; there was a general hypertrophy of the tissues; and he expressed himself as utterly devoid of any hope of retaining those teeth in position. He was a young man, about thirty-five years of age. He had been with the first Stanley expedition through Africa, and in that expedition he had contracted that terrific fever which they have there; and he told me he had taken as much as eighty to one hundred grains of quinine a day. After an examination of his mouth, I could find no other cause for the condition of things than his African experience. I made a most careful examination in his case. I had the examination made by a specialist, who is capable of making both physical and urinal examinations; and his system was found to be otherwise in a perfectly healthy condition. That man's case surrendered to treatment, and his mouth is now in a healthy condition. Had I found the condition of Bright's disease in his system, as he imagined, I should never have given a good prognosis. I gave such a prognosis at the start, and his case at the present day bears me out in my judgment of the case.

Dr. Allan.—I do not know that I have anything further to say on the question, except it be in regard to Dr. Black's papers upon the subject. If there is anything in our literature which equals them in thoroughness of detail I have not been able to put my hand upon them. I am quite certain that those papers published in the "American System of Dentistry" are the best compendium of this subject that we have.

In regard to the number of teeth lost through this disease I still think I am right, according to the figures and data that I have

been able to obtain, notwithstanding Dr. Truman's assertions to the contrary. I took great pains to hunt up statistics, and, I think, taking the definition of this trouble as an inflammation, or lesion of the peridental membrane, having its origin around the necks of the teeth, my statement is not so far from correct; but I was careful to state that it was only an approximate estimate, that the number of teeth lost through this disease might be equal to those lost through caries. Dr. Truman, I think, must have erred in his judgment or memory, as regards the formation of pus. It is not an absolutely necessary sequence or result of inflammation. Many inflammations exist in the body, in joints, and even near the surface, -even violent inflammations, -without the formation of pus, so long as micro-organisms are not present. Therefore, if the mucous membranes are maintained intact, there is no necessity that there should be any formation of pus in those places. Clinical examinations of cases, where tartar is present and the gums tumefied, have frequently shown them to be devoid of any indications of pus. I think I am right in saying that pus is not a necessary result of inflammation.

Dr. Truman speaks of my remark that, after dead teeth had been extracted, where the peridental membrane had been destroyed, and its connection with the circulation cut off, they were found to be, from the apical end to the gingival border, polished and clean. So I did; but I did not say it was so if the tartar had been left upon them. The supposition was that it had been removed. I spoke of that case to show the manner in which destruction of the peridental membrane takes place when the circulation had been cut off both from the apical and gingival borders.

I still hold to the point which I wish to make,—that a certain amount of roughness at the gingival border or neck of the tooth—as Dr. Sudduth suggested indirectly, and not with any intention of saying I had put it in my paper, but which I did have in my paper—may possibly be the occasion of the deposit of tartar; and that if the neck of the tooth is kept clean and polished, no tartar would form there, and we would not have pyorrhæa alveolaris in any of its forms. I am quite certain that, where the disease is so perfectly amenable to treatment,—following this line of thought,—and where we have perfect cures, such as I have frequently had without a particle of medication, but simply by mechanically removing the tartar, that the more this point is thought over and studied the more the theory will be adopted that pyorrhæa alveolaris has its origin in a deposit on the necks of the teeth from the gingiva. Whether the deposit is serumic in origin

or not, I do not know. I do not think there is any indication whatever that it comes from the saliva. It is deposited under the margin of the gum, away from the openings of the salivary duets, where the saliva has almost nothing to do with it. Whether it comes from the serum of the blood I do not know; but all its physical qualities are usually totally different from that of salivary calculus in every way. Therefore I think there is no ground for saying it comes from the saliva; and we are necessarily thrown back to another origin. If you can think of any other origin than the one Dr. Black has suggested, it is more than I can.

DISCUSSION ON DR. ELLIOTT'S PAPER, ENTITLED "LIGHT TO THE GENTILES."

Dr. W. H. Atkinson.—I hesitated to open the discussion of this paper, although a somewhat intimate acquaintance with the author gave me a certain insight as to what I might prepare for,—satisfaction at the general trend of the doctrine pervading the paper, which is based on a knowledge that is not as yet broadspread among the gentiles, and not well understood even by those who claim to be light-bearers to these people who sit in darkness.

The two special prerequisites for successful teaching are ability in the teachers and capacity in and willingness of the learners faithfully to pursue the studies projected. A notable example of unwillingness to take the requisite labor of study to comprehend molecular phases was brought to my attention after hearing one of the best papers-if not the best-I have ever listened to from this author's pen. It was read before one of our dental societies, and a prominent member remarked, "Two more papers such as that will put this society in its grave," and this without dissent from those who heard the statement. Subsequently I said to Dr. Elliott. "Be patient, pursue work in the line of your present investigations, and the time will come when they will gladly hear you in even more profound disquisitions than the beautiful elaboration just displayed." That paper was upon carbon and its combinations. I endorse the commendation of this society for its zeal in pushing investigations, with a satisfaction akin to the zeal expressed by Dr. Elliott in accepting the invitation to prepare a paper. And I take occasion to notice this evidence of the fulfilment of the words of encouragement spoken to him on the occasion referred to, and also to congratulate the management and this society on seeking and interestedly listening to papers of this character.

Without a knowledge of how prime elements become proximate elements, of which tissues, organs, and systems are built, we shall be utterly at a loss to comprehend the functions of production, nutrition, growth, and decay; of which there are two marked varieties,—the decay of molecular metamorphosis, in which prime elements are used up in nourishing functioning bodies, and the retrogressive changes in the various forms of disease by which structures are destroyed beyond the power of unaided repair. The first is the result of the running out of the line of longevity of the tissue involved; and in every instance where uplastic pabulum is at hand, the tissue is maintained in full type and vigor—is physiological. The second is where retrogressive nutrient metamorphoses take place from deficiency or surcharge of pabulum, or pabulum with a cacoplastic tendency; and this gives the basis of pathology, demanding therapeusis to bring about favorable results.

We might go on with beautiful, gratuitous statements of the views we take of the modes and degrees of functional activity, and dogmatically state, with the facility of the old Yankee physician, "I understand your disaster; this is good for what ails you; you take this and you'll get well."

My regret is for the gratuitous statements made as principles involved in the strictures on the use of sterilized sponge to induce secondary dentine deposit over exposed pulps. I should be glad, had we the time at our disposal, to make some observations in this line myself. I am confident that an open quiz, orderly conducted, would bring out our strength of knowledge in such demonstrable shape as to relieve us from regrets for losing respect for the kind of statement, devoid of knowledge, referred to. Opportunity has not yet afforded me stimulus to prove campho-phenique. I have read and heard enough to predispose me to it.

Respecting the theory of the consolidation of amalgams (the perfect example of which is crystallization), I am wholly in accord with Dr. Elliott. This is too deep a question to be lightly referred to, and calls for a separate paper or brochure clearly to state what is already known, and to point the way to a better understanding of the subject.

All crystallization depends upon currents of energy manifested by separate points of polarization from which the crystals arise. The simplest example of this is the freezing of water on glass. No recommendation to dentists to study chemistry can be made too strong, from its absolute necessity to a professional education.

If any gentile present feels the inadequacy of my effort in form

of statement or character of doctrine, I am ready to hear him and to reply to any question.

REPORT OF SPECIAL OBITUARY COMMITTEE.

The committee to whom was referred the matter of the death of Robert V. Jenks, of Paterson, Frank S. Eggert, of Frenchtown, and Thomas L. Cook, of Long Branch, would most respectfully offer the following report:

Whereas, It has pleased the All-wise Ruler of the universe to remove from our midst our late companion and member, R. V. Jenks, of Paterson, Passaic County, N. J., while in the full practice of his profession, and at a good old age, it is fitting that we should place upon record a proper testimonial to his virtues. He was a regular attendant of our annual gatherings, and manifested a keen interest in all its proceedings. Diffident and retiring, rarely appearing in course of the debates during our meetings, yet to his friends in a private way he would show that he had a genius in the way of small inventions and mechanical contrivances.

Resolved, That while we deplore his loss to our Society we would express our sympathy for his family and immediate friends.

AND WHEREAS, Frank. S. Eggert, of Frenchtown, Hunterdon County, N. J., in the fifty-seventh year of his age, has gone from our midst into the higher life, we feel to condole our loss. He was one of the oldest members of our Society and, so far as any duty fell upon him, he was faithful in the performance of it; and among his townsmen he displayed the characteristics of a useful citizen.

Resolved, That we sympathize with his bereaved family and friends as we are sorry at the loss of a useful member of our Society.

AND WHEREAS, Thomas L. Cook, of Long Branch, Monmouth County, N. J., has departed this life and gone out of our midst, we trust to join a higher one in the mansions of eternal rest, depriving us of a useful member of our association.

Resolved, That while we mourn his loss, and would place upon the records our appreciation of his virtues, we would express our sympathy with the sorrowing family.

Resolved, That we place upon our minutes the above preambles and resolutions, and send a copy of the same respectively to their families, signed by the secretary under seal of the Society.

J. HAYHURST, C. S. STOCKTON, B. F. LUCKEY,

Dr. Hayhurst.-Mr. President, I would like to say of Robert Jenks, that he was one of the five whom our President so feelingly referred to in his opening address. They were Drs. Chew, Cosad. Peirce, Jenks, and myself, men of advanced years, and we were mostly together. While the younger members of the Society preferred a more active manner of enjoyment, we associated ourselves together in a quiet, conversational way; and it always makes me think I am one step nearer that eternal rest which I have alluded to when it becomes my duty to speak of these bereavements. We are passing away, and when I look around and find that my associates in the beginning of this Society are becoming fewer and fewer every year, it is no wonder that sorrow comes into my heart and I feel that I am on the road to the beyond. You, young men, in the prime of life and the strength of manhood, who in the cultivation of your intellect enjoy advantages which we did not enjoy,—are you ready to take our places when we step from them? are you ready to uphold the dignity of the Society when you come among us? I hope you are; and if I could feel certain of it, as my connection with this Society nears its end, I would be happy and comfortable in that belief, and that the work which will descend upon your younger shoulders will be carried on as pleasantly, as socially, and with as much honor as when we older ones were in the harness. I thank you for your attention and for the quiet and impressive silence which seems to answer the appeal I have made.

THE DENTAL PROTECTIVE ASSOCIATION.

The report of the Special Committee in the matter of the Dental Protective Association was read and adopted.

Resolved, That we heartily approve of the Dental Protective Association of the United States, and urge all who are not members to become so at once.

C. S. STOCKTON,
W. PINNEY,
FRANK. M. ODELL,

Dr. Peirce.—Mr. President, I want to say a word in regard to the Dental Protective Association. The matter is intensely in teresting to me, and it seems to me that every member of this Society, as well as every member of the profession, owes it to himself and to his professional brethren to support that Association. I think I am familiar with its conception, and with the work that has been done, and I know there has never been an organization

established within our order that bids fair to be of greater benefit to our profession at large than this Dental Protective Association that has been established in Chicago and of which Dr. Crouse is the chairman. I hope every member of this Society will feel it incumbent upon him to connect himself with it and forward his ten dollars for membership. You know we are periodically harassed by threats of suits, against which no individual feels able to defend himself; and here is an Association which says that for a paltry sum it will take these suits upon its shoulders and guarantee to protect and defend you against any combination that may come forward for the purpose of exacting illegal royalties.

Dr. Sudduth.-Mr. President, I have been, during the past year, in attendance upon the meetings in various States throughout the country, from the West to the extreme East, and have been surprised at the lack of interest in this movement, and, really, fears have been raised in my mind that it will fail on account of lack of interest on the part of the dental profession. In my opinion, it is the most vital question that has been brought forward in dentistry in the last decade. We must, as a profession, take hold and support this movement, or else we are going to have saddled on us a burden that will take twenty or twenty-five years to throw off. A gentleman, who is intimately connected with dental manufacturing, said to me the other day that he saw there was a possibility of its failure, through lack of interest and support on the part of the profession. If it does go down, you will have a repetition of the bull-dozing claims of the old Dental Vulcanite Company. It will only cost you ten dollars to get helped out of this difficulty now; it will cost you many times that amount if you do not combine for defence against these patents. The committee have about decided to adopt a limit to the number that shall be known as incorporators, who will come in by a payment of ten dollars; and you will wake up some day to find that it will cost you twenty-five dollars to get in. So you had better take the chance while you have it to get in for the smaller sum. Dr. Crouse made a proposition at Boston to the effect that any man who put his name down, with the intention of paying, would be considered a member, and given an opportunity to pay up at a later date, say some time the first of the year. If a suit is brought against you, the Association will not defend you unless you are a member; you must come in before a suit or injunction is brought in order to be defended by the Association.

(To be continued.)

Editorial.

OUR POSITION.

THE Items, in a short editorial on "its position," in which it defines the purposes of "its" company publisher to be "to bring to the average dentist the greatest amount of practical information possible, whether original or selected, and of raising his standard morally, socially, and professionally," says further:

"Journals presenting more scientific and exhaustive articles are also doing a good work, and it is difficult to see how a progressive dentist can do without one. Not to disparage any of our dental periodicals—for American dentists should be proud of all of them—we are pleased to make special mention of the high standing and progressive character of the International Dental Journal, edited by Dr. W. X. Sudduth, of Philadelphia. This magazine was admirably conducted while under the supervision of Dr. Barrett; but it has lost none of its vim and thoroughness and dignity under the management of its present editor. Every number shows he is putting into it his very life."

We feel like thanking the genial editor of the Items for these kindly comments upon the course of the Journal. It is our aim to try and inculcate in the minds of our readers a higher professional tone in business as well as professional ethics, and lead up to an understanding of the principles which underlie dental science which are identical with those relating to medicine. When these are fully understood, and the "why" of things rather than the "how" is the query upon the lips of speakers in our dental conventions, then will dental science merge into medical science, and dentistry be a specialty in medicine, which is her rightful heritage. Surgery occupied a position similar to that from which dentistry is now rapidly emerging. It was by looking to medicine for instruction in the principles that underlay surgical practice that surgery became adopted as a specialty in medicine, and so will dentistry. Our field is to deal with these principles which, when they are fully understood, will indicate the method of procedure in every instance. He is the best dentist who can explain to himself the reason why he adopts a certain line of treatment, and has the mechanical ability to carry out the suggestions derived from the study of the cause

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of the pathological conditions existing in any given case. We are free to admit, however, that a very fair dentist may be made by teaching a man the "how" of dentistry; but the same individual would have made a much better dentist had the "why" at the same time been included in his instruction. If you feel that your education has been neglected in the principles of dentistry, do not conclude that it is too late to learn, but attend at once to it that you are put in possession of the means of self-instruction which is to be found in our dental literature, which may be taken to your fireside and perused at leisure. There is not a dental journal published in this country but what contains suggestions which, if adopted, will many times repay the price of the subscription, and of no other journal can this be more truthfully said than of the International Dental Journal, which is replete with original matter, fresh from the offices and laboratories of the best men in the profession.

The present number closes volume ten, the first complete one under our management. We look back with conscious pride at the steady improvement made during the past year. Each number has been an advance upon its predecessor, and it shall be our aim to continue to add to the value of its contents and the high standard of its mechanical execution; but in order to do this we must have the hearty support of the profession for whom the JOURNAL is published.

We are sorry to say that some are in arrears for this volume, and unless we hear from them between now and the issuing of the January number, we shall be compelled to drop them from our list, a consummation we should most heartily deprecate. We therefore make the following offer: to all those who know themselves to be behind in their subscription, and who will send us a check for five dollars for two years' subscription, we will forward them by mail, postage paid, our new International Binder, for volume ten, free. It consists of a cloth case for binding the complete volume, and printed in gold on the back are the words, "The International Dental Journal, Volume X.," and the date "1889;" also, "Published by the International Dental Publication Company, Philadelphia." On the side are the words, "The International Dental Journal, edited by W. Xavier Sudduth," also in gilt. These cases can be sent to any ordinary bookbinder, and, for a trifling outlay, the separate numbers will be sewed and pasted in the already prepared backs. These cases will be provided annually in order to secure uniformity in binding for succeeding numbers.

A NEW USE FOR THE PHONOGRAPH.

Dr. Walker, with his characteristic enterprise, brought out the phonograph in a new rôle at the last meeting of the First District Dental Society, November 12. Dr. L. Ashley Faught (Philadelphia) had prepared a paper for the society on "Some Notes on Methods of Practice," which he consented to read before a few invited members of the profession in Philadelphia previous to reading it in New York, in order that the subject might be discussed into the phonograph and repeated at the New York meeting. The object being to add to the interest by introducing a novelty and at the same time conserving the interests of science by bringing the ideas of absent members of the profession into the meeting. It was a decided success; the reproduction of the voice was so perfect that no difficulty was experienced in recognizing the speaker. Mr. Edison's agent said in substance, in introducing the instrument, that,—

"Although some ten years have elapsed since Edison startled the world by inventing a machine that recorded sound and reproduced it at will, it is only within the past few months that this wonderful invention has been brought to such a degree of perfection as makes it of practical utility to the public at large. The original phonograph, while valuable in demonstrating the possibilities of human invention, and as opening up a field of research in acoustics previously unexplored, lacks the elements essential for practical use. The metallic and sometimes indistinct sound-waves that were emitted from the primitive tin foil, the lack of proper incidental mechanical appliances, the want of a suitable material for the impression plate, and numerous other defects, made the invention useful principally in the laboratory of the scientist, or in the museum of curiosities.

"These early defects have at last been all overcome, and the perfected phonograph and phonograph-graphophone, for the multitudinous purposes for which they can be used, are as practical as the type-writer or the telephone in their respective spheres. By them the slightest shades and variations of the human voice are registered and reproduced with absolute accuracy. Music, whether vocal or instrumental, solo or multiple, in all its rhythm, melody and intonation, the lowest as well as the highest notes,—in a word, all sounds of every kind and character, may be treasured up in these extraordinary machines and reproduced, not once, but thousands of times, and may be mechanically duplicated and multiplied to any extent. The utility of this invention at this early day can scarcely be estimated. The uses of an instrument with such manifold functions would seem to be circumscribed only by the uses subserved by the property of sound itself."

The instrument was so arranged that all in the room could very distinctly hear most of what had been said into it at the prelimi-

nary meeting in Philadelphia. And thus were added to the discussion on the paper by the New York members and visitors the remarks of Professors Truman, Guilford, and Laplace, and Drs. Head, Kingsbury, and Roberts, of Philadelphia, who were unable to attend the New York meeting. Previous to the introduction of the discussions, however, a few typical specimens of its power were shown. The music of a martial band had been received upon a cylinder, and was reproduced with great distinctness even to the notes of a bugle-call in the distance. A minstrel quartette had sung into the phonograph a negro melody, into which had been introduced the sound of a steamboat whistle and the ringing of her bells as she left the landing. These were reproduced with such vividness as to almost carry one "away down among the cornfields." These and other pieces were presented to prepare the society for the demonstration that followed. This was considered necessary, because the Philadelphia members had never had any previous experience in speaking into the instrument. Regarding this unacquaintance, Dr. Truman facetiously expressed himself by saying that while it gave him great pleasure to thus converse with the members of the First District Society in the guise of a "spirit," vet he was not very well acquainted with the "medium," but hoped that it would do him justice. In consequence of this unfamiliarity with the instrument the remarks of some of the gentlemen were audible only to a few in the audience, but were distinctly reproduced by means of the ear-tubes.

The meeting was a decided success. There were fully one hundred and fifty in attendance, and all were delighted with the experiment, for experiment it was, being the first time a phonograph-graphophone was ever used as an adjunct to scientific discussion. The possibilities of this wonderful instrument are only to be surmised. It requires the imagination of an Edward Bellamy to write of an approaching phonographic age, which he has recently done in "With the Eyes Shut," in which phonographic literature is introduced on all railroads to prevent injury to the eyes in reading ordinary literature in the bad light and jolting cars. Mechanical devices announce, by means of the phonograph, the names of the different stations. He describes a not impossible experience, when hotels shall have been supplied with clocks fitted with phonographic attachments, in the following language:

[&]quot;I was startled in my dreams by the voice of a young woman who could not have been standing more than ten feet from my bed. If the tones of her voice were any guide, she was not only a young woman, but a very charming

one. 'My dear sir,' she had said, 'you may possibly be interested in knowing that it now wants just a quarter of three.'

By the introduction of the phonograph-graphophone in our meetings, it is possible to add materially to their interest. Since the idea of inviting individuals, many times resident widely distant from the meeting-place, has been adopted, it is often a burden to attend in person. This can now be wholly obviated by the aid of the phonograph, which will no doubt be largely used, and every society can rent an instrument and reproduce for the delectation of its members the dulcet tones of New York's orator, the fire of Chicago's leader, or the fatherly admonitions of the patriarch in dentistry. Amusing incidents could be recorded for the edification of those not present. What would we not give for an exact record of the tilt-at-arms between "the member" from Texas and some of the brethren at Louisville summer before last, especially his laconic reply to the query of why he used sulphur in the treatment of some oral disease,-"To kill the bugs." Then again, the exact words and accents of the fathers in dentistry, who are so rapidly passing away, could be stored up and each society have its library of registered phonograms. Exchange copies could be had and the characteristics of speech and voice of those whom we know by name could be introduced to us in person, and in after years, when otherwise nothing but their writings remained, we could take down the special cylinder and spend a few minutes in private conversation with them, thus getting, as it were, a special interview, which always puts the individual on better terms with the writer than anything else.

We prize the autographs of celebrated men; how much more so would we cherish their phonograms!

OUR CLOSING REPLY ON TRADE JOURNALISM.

The Cosmos has allowed the whole question to go by default, with the exception of the one paragraph in which we tried to explain why the company publisher of the Cosmos would not allow its organ to enter into an aggressive fight in the interest of the profession.

No argument has been advanced in answer to our first editorial, in which was discussed the evident dereliction of duty upon the part of that journal towards the profession; neither has any attempt

been made to answer our query as to "who made the editor of the Cosmos censor of the profession as to what its members shall or shall not discuss in their meetings and journals."

The two editorials written in answer to our strictures have labored hard to make the matter a personal one. The first editorial began with a questionable story, which ended with the following words: "Some of them do, and the rest mind their own business," to which was gratuitously added (italies ours),—

"We would respectfully refer the editor of the International Dental Journal to this incident as conveying a lesson which it would do him no harm to consider. . . . It will require something more than the impudent criticisms of the editor aforesaid to lessen the confidence of its nearly eight thousand readers. . . . While it is not uncommon for a neophyte to be over-zealous, there can be no excuse for deliberate and officious intermeddling and misrepresentation. . . . We exceedingly dislike personal controversies with contemporary journals, but when an editor deliberately and repeatedly goes out of his way to criticise the conduct of the Dental Cosmos and to assign motives there for, we submit that he violates the rules of polite journalism, and invites the hint that he had better attend to his own business and let other people's alone.

To all of which an impersonal and unimpassioned answer was made, with the effect of calling out the following:

"We took occasion in the Dental Cosmos for October to counsel the editor aforesaid that success in journalism was not to be obtained by detraction and misrepresentation of his contemporaries, and advised him that he would be better engaged in attending to his own business than in meddling in that of his neighbors. In his November issue he claims that the article which we criticised was written from 'an entirely impersonal point of view,' and expresses surprise and regret at the tone of our rejoinder, which he considers personal, as we meant that he should."

The same editorial pronounces ours as "unadulterated impudence," and closes with this clause,—

"Taking leave to add that this commentary is not impersonal."

We are perfectly willing to drop the question on the presentment, and abide the decision of the profession, being fully aware that it "prefers to use its own common-sense" and draw its own inferences.

Foreign Correspondence.

TO THE EDITOR:

Report of a case of death concurrent with the administration of nitrous oxide.—In a discussion on anæsthetics, which took place at the annual meeting of the British Dental Association, held at Brighton in August last, I took occasion to state that while my twenty years' experience of nitrous oxide gas had been free from either serious or fatal results, it had frequently been interspersed with cases presenting disagreeable and alarming symptoms. So much so that it had been to me the cause of more anxiety than the administration of chloroform during the same period.

I also ventured to assert that asphyxia accompanied the deep stage of "gas" narcosis, and that the presence of the symptoms of asphyxia, causing the administrator to cease giving the gas, was the one point wherein lay the greater safety of gas over other anæsthetic agents. That this safeguard is not always effectual may be gathered from the report of a fatal termination occurring in the exhibition of the gas which occurred at Edinburgh, Scotland, on October 1, in the practice of G. W. Watson, L.D.S., an account of which may be interesting and instructive to your readers, and may possibly cause many professional men to be more careful than hitherto in the administration of an agent which is so universally considered to be free from the dangers attributed to chloroform or ether.

Lady Milne, aged seventy-one, had been suffering from antral abscess for over twelve months, and the disease proving intractable to medical treatment, she was referred by her medical consultant to the care of Mr. Watson.

An appointment having been made, she, accompanied by her husband and daughter, attended at Mr. Watson's surgery at the time agreed upon.

Mr. Watson located the cause of trouble to be the second left upper molar; the left upper wisdom tooth was also very carious and beyond restoration. He determined to extract these two teeth, and to obtain free access to the antral cavity by enlarging the abnormal opening through the floor of the antrum via the socket of the second molar.

The patient being seated, the upper portion of her dress was unloosened, the gag adjusted, and with the aid of an assistant gas was administered. The respiratory movements were somewhat weak, but, considering the age of the patient, this did not excite any apprehension, and, no other unusual symptom occurring, the required stage of narcosis was speedily induced.

The two teeth were extracted, and the floor of the antrum opened without the patient evincing any signs of consciousness; a copious stream of pus mingled with blood flowed from the socket, and as Mr. Watson was removing this from the mouth by a sponge, he noticed a sudden and alarming change come over the countenance of the patient, the face becoming first pale, then livid, then waxy.

She was immediately laid prone, the tongue pulled forward, nitrite of amyl applied, and artificial respiration resorted to. In the mean time, medical assistance was sent for, and Dr. Murdoch Brown arrived in about five minutes. Artificial respiration was continued, and ether first injected hypodermically and subsequently into the heart. All efforts, however, were in vain, and the sad admission had to be made that restorative efforts were futile, and death had claimed its own.

Mr. Watson states that, so far as he could observe, stoppage of breathing and cessation of the heart's action occurred almost simultaneously. There was no spasmodic twitching. There was slight muscular relaxation. The patient was tightly laced. The food taken three hours before was undigested, fear having apparently suspended the process of digestion. [The state of the food was ascertained by some of it having been expelled during the application of artificial respiration.] The patient suffered from fatty degeneration of the heart.

Such, then, is a concise history of the first case of death in Scotland concurrent with the administration of nitrous oxide gas. I will not venture to offer an opinion as to the initial cause of death in this instance,—whether from syncope, resulting from fear of the gas, from shock of the operation, or from asphyxia,—but leave your readers to draw their own conclusion, merely remarking, in conclusion, that there is no question as to the purity of the gas, that from the same bottle (100 gallons compressed) having been used before and since without any deleterious effect.

TO THE EDITOR:

A Simple File and Binding for Dental Journals.—To those who take several dental journals and do not have special receptacles for them, a means of filing them together and temporarily binding them is very desirable. One does not always desire to go to the expense of having them regularly bound, and when one does, the loss of the advertisements is a serious one to those who take an interest in the latter and desire to refer to them.

When two or three of the year's numbers have accumulated, they should be made a nucleus of a volume in the following manner: Take eighteen inches of soft iron wire, the size of a darningneedle, or smaller, and slightly sharpen the ends. With a drillpointed instrument,—a shoemaker's awl or a rubber-dam punch, make two holes about four inches apart and one-fourth inch from the back of the first number of the JOURNAL; that will bring each hole about where the binding wires of the International comes. two and a half inches from each end. Now push the two ends of the wire through the two holes from the face side of the January number, and you will have the two ends of the wire seven inches long, extending up from the back of the journal and four inches lying smoothly along its title-page. Lay the February number next to the wires, and mark where the holes are to be punched, to correspond with those in the January number. Punch the holes and slip the second number on the wires face down, and proceed with the other numbers on hand. When these are all on the file, bend the ends of the wire down out of the way. When the next month's number arrives, punch it, raise the wire ends, and file it away in the same manner. When the year's numbers are complete, twist the three-inch ends of the wire firmly together, and your volume is ready for reference with its index, and your numbers have been kept together during the year. Any number is readily removed at any time by raising the wire ends.

L. C. BRYAN.

BASEL, SWITZERLAND.

Domestic Correspondence.

TO THE EDITOR:

After reading the query of Dr. Quick in your journal, and reflecting a moment upon the course pursued by your Society in referring the same to a committee, it is suggested to my mind that any report of cases at all similar might be of service to all concerned.

I would therefore ask the privilege of reporting the following:

Mr. A-, aged about thirty-four years, an Englishman by birth, a minister of the gospel, married, and generally enjoying good health, I learned was confined to his house, and had been compelled to think seriously of resigning his position, and wait patiently for the final summons to eternal rest. By accident his sister became one of my patients, and, while I was operating upon her teeth one day, she happened to mention her brother's condition, and gave me the following history of the case: About four years previous he was attacked with severe neuralgic pains in both temporal regions, together with soreness in the angle of the jaws and great depression of spirits. Accompanying these paroxysms would be several days of extreme trismus and almost starvation, owing to the inability to perform the act of mastication; and as his denture was almost perfect, his attendants had found it difficult to supply him with even liquid nourishment. Periodically this condition of affairs would recur, until, finally, suppuration took place, and though the pus escaped from the corners of his mouth, with its usual concomitant symptoms, his physicians found it impossible to locate the origin of the pyogenetic condition,—and advised him to wait for further developments. The patient was finally advised that his teeth might possibly have something to do with his trouble, and to consult a dentist; this he did, and was told that his teeth were all sound, and he must seek relief from some physician. As stated above, this condition continued for about four years, alternating between the most agonizing pain and some slight occasional improvement, until despair found a habitat in the mind of our friend. and with true Christian resignation he had drawn his mantle around him and laid him down to die.

Inasmuch as his sister told me that he had discarded all profes-

sional attendance, I thought I should violate no section of ethics in asking an interview. I did, and was allowed to see the patient. In a little while, I felt convinced that the difficult and almost impossible eruption of the wisdom tooth was the main etiological factor in the pathology of the case. Strange to say, the right lower first molar had been lost, and the third was in sight, though the trouble was as acute on that side as the other, and the effusion as great. I thought, however, this might be sympathetic, and with liniments and massage succeeded in about a week in getting sufficient space between the jaws to admit my forceps, when I extracted the left lower second molar (with great difficulty), and dismissed the patient with an antiseptic mouth-wash. Suffice it to say, recovery has been complete, and the patient is following again his chosen profession, well and happy, though surprised that so much could be accomplished by the extraction of a tooth.

E. L. CLIFFORD, D.D.S.

CHICAGO, ILL., July 20.

TO THE EDITOR:

I herewith send you for publication the programme for our January meeting as far as we have gone:

We hold our meetings on January 14, 15, 16, at (Grand Lodge rooms) Masonic Temple, Twenty-third and Sixth Avenue, and the clinic on the 15th and 16th, at the New York College of Dentistry, Second Avenue and Twenty-third Street.

We have three papers written expressly for this meeting,—an illustrated paper ("Photo-micrographs") showing the pathological conditions of the teeth, by Dr. George S. Allan, New York City; a combination paper, by Drs. E. T. Darby and Edward C. Kirk, of Philadelphia; and one by Eugene S. Talbot, of Chicago. These papers will be fully discussed by persons specially invited to do so; and we will remain all night, if necessary, in order to accomplish it. One great fault with previous meetings has been that papers were never fully discussed; but on this occasion they will be.

We will not have dental displays or exhibits of any kind; but, strictly speaking, a dental meeting. I find it a very hard task to get all dental manufacturing companies to take part. So rather than have a sort of institute-gain machine-shop and blacksmith display, it has been decided to have no exhibition. H. J. McKellops, M.D., D.D.S., of St. Louis, Mo., has kindly consented to act as supervisor of clinics, in connection with Dr. C. V. Jackson, of New York City.

I also send you the names of those who will clinic WITHOUT FAIL. Dr. T. H. Parramore, Hampton, Va.; Dr. George Enbark, Birmingham, Ala.; Dr. Steward Arnold, Aniston, Ala.; Dr. T. S. Waters, Baltimore, Md.; Dr. Frank B. Darby, Elmira, N. Y.; Dr. F. T. Van Woert, Brooklyn, N. Y.; Dr. H. A. Parr, New York City; Dr. C. S. Stockton, Newark, N. J.; Dr. A. W. Harlan, Chicago, Ill.; Dr. S. C. G. Watkins, Mount Clair, N. J.; Dr. T. C. Shumway, Plymouth, Mass.; Dr. J. Albert Kimball, New York City; Dr. W. R. Clifton, Waco, Tex.; Dr. M. A. Bland, Charlotte, N. C.; Dr. George McElhany, Columbus, Ga.; Dr. George H. Wells, Augusta, Ga.; Dr. George H. Winkler, New York City; Dr. H. H. Sisson, New York City; Dr. J. S. Campbell, London, England; Dr. Wm. H. Dwinelle, New York City; Dr. E. Parmly Brown, New York City; Dr. R. Ottalingue, New York City; Dr. George Evans, New York City; Dr. R. B. Adair, Gainsville, Ga.; Dr. Thomas J. Moore, Columbus, N. C.; Dr. G. L. Curtis, Syracuse, N. Y.; and others that we are expecting to hear from very soon.

> W. W. WALKER, Chairman Executive Committee.

RESOLUTIONS ON THE DEATH OF DR. LEON RIDEOUT.

Whereas, The Alumni Association of Boston Dental College has been called upon to mourn the loss of one of its members and a past president, Dr. Leon Rideout, of Lynn, Mass.

Resolved, That we mourn the loss of our associate, a man of integrity and uprightness, who was ever earnest to elevate the profession and advance its interests; respected in the community in which he lived. May our memory of him be always kept fresh by the good we know he did to mankind.

(Signed) E. O. KINSMAN, S. G. STEVENS, J. K. KNIGHT,

> WM. RICE, Secretary.

BOSTON, 1889.

Current News.

CHICAGO AND VICINITY.

THE dentists of Chicago have subscribed for more than fifteen thousand dollars of the Stock of the World's Fair.

Dr. H. J. McKellops, of St. Louis, was the guest of the Odontological Society, at their recent meeting, held November 19, at the Leland Hotel.

Dr. E. S. Talbot is delivering a special course of lectures at the University Dental College, upon the etiology of the Irregularities of the Teeth. These lectures will shortly appear as a portion of the second edition of his book on "Irregularities of the Teeth."

The dental colleges of Chicago have the largest classes this session of any year in their history. This is doubtless due to the recent action of the National Association of Dental Faculties, making it obligatory upon all colleges of the Association to require, after the session of 1790-91, three years of college instruction of all students before graduation.

Dr. Truman W. Brophy, Dean of the Chicago College of Dental Surgery, has been suffering from a severe attack of bronchitis and has gone to California for the winter. His many friends will hope to hear of his speedy recovery.

At the October meeting of the Chicago Dental Club it was voted to make the International Dental Journal the official organ of that body, and hereafter it will publish its proceedings in that Journal.

Dr. Crouse is not growing thin over the suit for damages brought against him by the International Tooth Crown Company for his efforts in protecting the dentists against the claims of this company. If you are not already a member of the Protective Association, it would be wise to get in as soon as possible.

THE first time you are in Chicago call on Dr. R. F. Ludwig and see his new suspension engine, run by the electric motor. It is novel and quite inexpensive, and we hope he will place it on the market.

Dr. John S. Marshall has been appointed secretary of the National Association of Dental Faculties *vice* Dr. J. E. Cravens, who has resigned on account of his removal to Paris, France.

THE idea of a grand "memorial meeting" of the American Dental Association, in 1892, pleases the dentists in this neighborhood, and if the World's Fair should be located in Chicago, the profession at home and abroad will receive a royal welcome.

Some members of the profession put down their names as members of the Dental Protective Association of America, agreeing to pay up on or before January 1, 1890. Dr. Crouse desires to remind them that the day is near at hand.

Dental Protective Association.—At a regular meeting, held October 28, 1889, it was resolved, that the Brooklyn Dental Society endorse the Dental Protective Association and recommend its members to join said association at once.

Louis Shaw,

Corresponding Secretary.

BROOKLYN, November 15, 1889.

At the Georgia State meeting several members reported cases of teeth assuming the color of green glass, apparently due to the use of the "Howe screw-post." It was found very difficult, if not impossible, to bleach the tooth and restore the natural color.

SOMETHING must have come over the spirit of the dreams of the editor of the Cosmos in that two rather stale jokes have crept into the editorial columns of that staid journal lately.

Rubber dam should be thoroughly washed in soap and water, perfumed, and kept in an air-tight case. Place a very small, fine napkin between the lips and the dam.

B. H. CATCHING.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

Special Notice.

The resignation and removal to Paris, France, of Dr. Junius E. Cravens, has made necessary the appointment of a secretary to this position.

On the recommendation of the Executive Committee, I have appointed Dr. John S. Marshall, of Chicago. All communications requiring the attention of this organization should hereafter be sent to his address, No. 9 Jackson Street, Chicago, Ill.

JAMES TRUMAN, President N. A. of D. F.

PHILADELPHIA, November 25, 1889.

Ar the annual meeting of the New England Dental Society, held in Springfield, Mass., October 23, 24, 25, the following were elected officers for the ensuing year: President, Dr. C. W. Clement, Manchester, N. H.; First Vice-President, Dr. W. E. Page, Boston, Mass.; Second Vice-President, Dr. J. F. Adams, Worcester, Mass.; Secretary, Dr. Edgar O. Kinsman, Cambridge, Mass.; Assistant Secretary, Dr. W. P. Cooke, Boston, Mass.; Treasurer, Dr. G. A. Gerry, Lowell, Mass.; Librarian, Dr. A. H. Gilson, Boston, Mass.

Executive Committee.—Dr. C. A. Brackett, Newport, R. I.; Dr. S. G. Stevens, Boston, Mass.; Dr. J. H. McQuade, Medford, Mass.; Dr. George F. Cheney, St. Johnsbury, Vt.; Dr. George A. Young, Concord, N. H.

EDGAR O. KINSMAN, D.D.S.,

Secretary.

CAMBRIDGE, MASS.

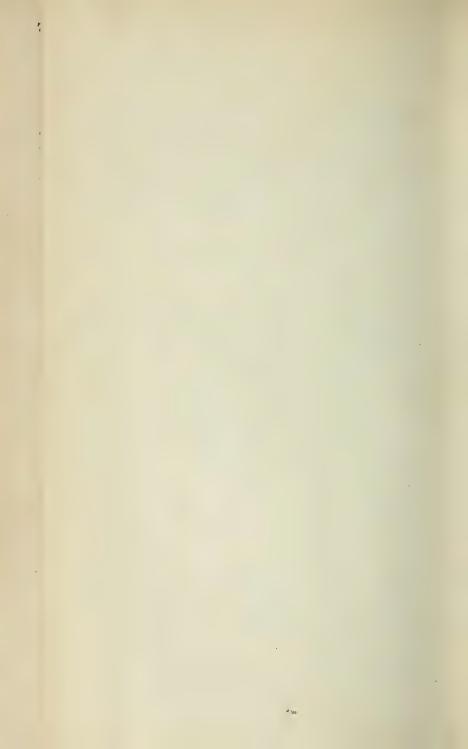
At the annual meeting of the Odontological Society of Chicago, held November 19, the following officers were elected for the ensuing year: President, Dr. P. J. Kester; Vice-President, Dr. F. H. Gardiner; Secretary and Treasurer, Dr. E. Noyes; Curator, Dr. Garrett Newkirk, New York; member of Board of Censors, Dr. George H. Cushing.

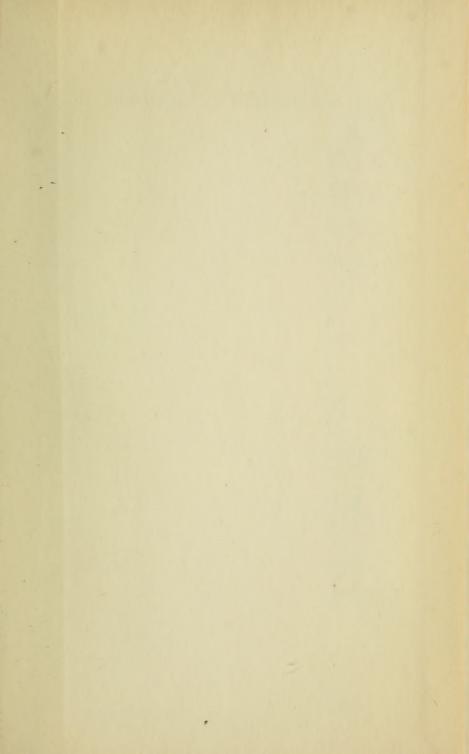
E. Noyes,

Secretary.

CHICAGO, November 27, 1889.







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